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# PC HARDWARE

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**SPECIAL ISSUE** WINTER 2008

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## 9 PC-Crushing Games! page 62



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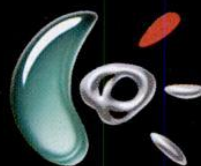
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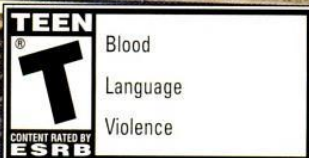
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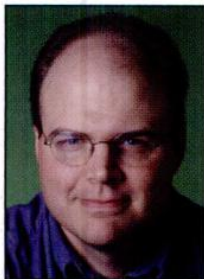


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## Release Notes

# Let Games Lead the Way

**W**indows Vista is both a blessing and a curse for gamers. It gives us access to DirectX 10 and all of its eye-candy, sure; but it also carries a high price tag and performance issues.

Like it or hate it, or simply be ambivalent about it, Vista is the future for Windows and PC gaming—despite a rocky first year on the market marred by slow sales and few compelling software reasons to upgrade from XP. Even with the marketing juggernaut behind DX10 and the hype about how it would dramatically improve the look of games, DX10 games have been slow to trickle onto shelves.

It's been a bit of a chicken-and-egg situation, as developers have been reluctant to devote resources to DX10 bells and whistles when so few gamers would be able to take advantage of them—which you can chock up to Vista's slow adoption rate. And the first few eggs that did hit our hard drives did little to make us run out and buy the chicken, so to speak.

This situation is changing—now. The slow trickle of DX10-enabled games has increased to a steady stream of AAA titles (witness *Crysis*, *Hellgate: London*, *Company of Heroes: Opposing Fronts*, *World in Conflict*, and others) whose best qualities won't be seen if you play on Win XP and DX9. For the lowdown on exactly what DX10 will add to your gaming experience, turn to page 78. And for a look at the hottest games—both DX9 and DX10—that will make your PC beg for upgrades, check out our “9 Games That Will Punish Your PC” feature on page 62.

The good news is that the prices of DX10 videocards have fallen during the past year, and both Nvidia and AMD/ATI have also released fast mid-range DX10 cards that will give your PC a solid kick in the pants. Even if you don't upgrade to Vista, DX9 games such as Valve's Orange Box bundle will still benefit from the latest hardware—you'll enjoy blistering framerates and some graphical embellishments that simply aren't possible on last-gen DX9 cards. And many of the latest titles are coded to take advantage of multi-core processors, which have also dropped considerably in price, so if you're not rolling with at least a dual-core rig, now is the time to make the move.

Our gargantuan buyers guide is jam-packed with expert advice from the *Maximum PC* crew about each and every critical component of a kickass gaming rig. Read it, arm yourself with the knowledge therein, and shop with confidence.

— Steve Klett

## HARDWARE BUYERS GUIDE

# 12



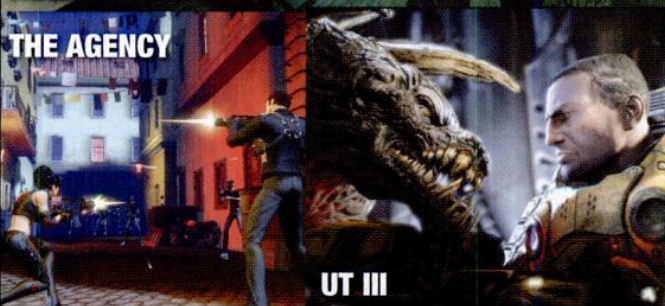
Expert advice for selecting the fastest parts to upgrade your gaming rig—or to build a new one.

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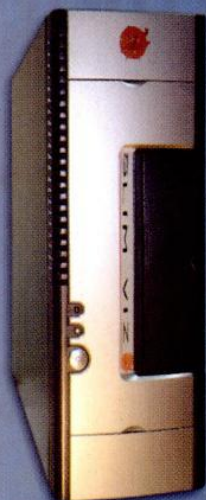
# 62

## 9 PC-CRUSHING GAMES!

The upcoming crop of AAA titles look amazing! Join us for our tour of the hottest titles to have on your hard drives this holiday season.



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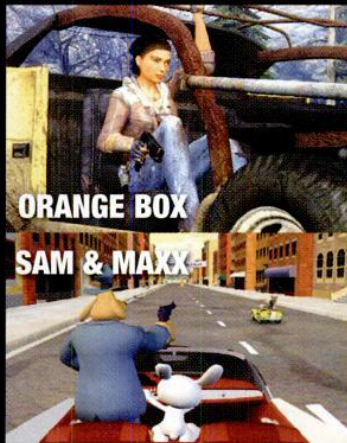
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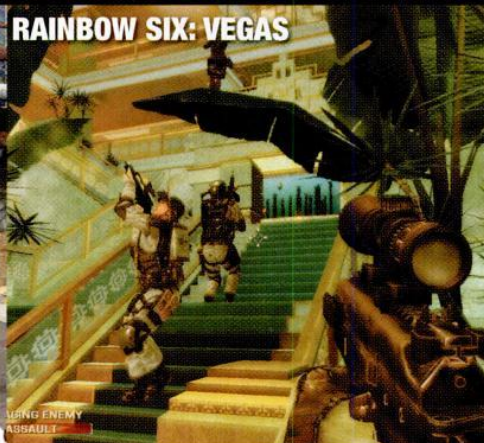
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## 78 DIRECTX 10 EXPOSED!

We take a hard look at the technology powering all the gorgeous effects in today's next-gen PC games.



ORANGE BOX  
SAM & MAX



RAINBOW SIX: VEGAS

## 87 THE BEST GAMES OF 2007

A showcase of all of our favorite games from the past calendar year—and an excellent shopping guide of must-haves for the gamer on your holiday list.

## 96 HARDWARE AUTOPSY

Come on, admit it—you've always wondered what makes an Xbox 360 HD drive tick, haven't you? Turn to the back page to find out!



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# HARDCORE

**Win the frame-rate war with our expert buying advice for every critical component of a kickass gaming rig! Everything you need to know is right here—whether you are building a new machine or upgrading.**

Ah, the holidays...our favorite time of year! When “normal” people’s thoughts turn to Rockwellian scenes of families breaking bread at tables laden with turkey and gravy, our thoughts naturally turn to what new kit we can cajole out of St. Nick (or our parents, significant others, or our own “left over” gift-buying budgets) to squeeze yet more performance out of our pride and joy—our gaming PC. Or, perhaps this is the year to start over again from scratch and build a bigger, better, more powerful machine with which we can etch our name in glory for all to see in Team Fortress 2’s hotly-contested playgrounds?

Either way, it’s a great time to be a PC gamer: Prices on mid-to-high-end DirectX 10 videocards have fallen a bit since last year—just in time for the first rush of games that at least begin to live up to the immense hype lavished on Vista’s gaming prowess (see stories, pages 62 & 78). And the same is true for dual-core and even quad-core processors and displays. Never before have you been able to get so much PC horsepower for so little.

The only hitch: a mind-boggling array of choices await you at whatever local electronics treasure trove you frequent. Not to worry, our massive buyers guide will arm you with the information you need about all the latest hardware.

Tomorrow’s PC-crushing games are here, make sure you’re ready!



CPUS, PAGE 14



MOTHERBOARDS, PAGE 18



VIDEOCARDS, PAGE 26



HARD DRIVES, PAGE 38



# HARDWARE



OPTICAL DRIVES, PAGE 42



SOUNDCARDS, PAGE 46



CASES, PAGE 49



DISPLAYS, PAGE 54



ACCESSORIES, PAGE 58

Game image: Unreal Tournament III



# THE GREAT CPU CONUNDRUM

Quad Core Computing: It's what's for dinner—and breakfast and lunch, too



Last year it didn't make sense to own a quad-core. Today, it's the only CPU to have. Superlative at media encoding, multi-tasking and gaming, we wouldn't want a machine today without a quad-core chip. Most new games that hit the market today are optimized (hyber-threaded) for multi-core processors—such as *Hellgate: London*, *Supreme Commander*, and *Company of Heroes* (pictured above). But which multi-core CPU do you buy? Sadly, there's really only one choice: Intel as AMD still hasn't responded with a quad-core chip. Here's how Intel and AMD's chips stack up and what's on the burner for both CPU companies.

## INTEL

After two years in the lead, Intel's advantage over its arch enemy AMD is pretty much clad in titanium. Its chief competitor has had absolutely no tangible response to Intel's quad-core processor except for a lot of posturing. And now before AMD can even get a new chip out, Intel has hit again with its new 45 nanometer processors, which will make it even more difficult for AMD to catch up.

A nanometer is one billionth of a meter and this new process literally shrinks the size of the actual tens of millions of transistors used to make a CPU. The previous top chip based on the older and larger 65nm process, Intel's Core 2 Extreme QX6850, featured 582 million transistors and took up about 286mm<sup>2</sup> of space. Intel's new 45nm-based chip features 810 million transistors yet occupies only 214mm<sup>2</sup> of space!

The new processor isn't just shrinky-dinked, either. Realizing that AMD is still a dangerous animal, Intel has baked in a number of goodies to hold onto that lead. The new chip features a new instruction set dubbed SSE4 that's aimed at improving media chores such as digital-image editing, video editing, and video conversion as well as number-crunching chores that are useful for supercomputer work. There are a number of

other improvements, as well, such as a two-fold boost in math division abilities over the previous chip; and one of the execution cores (think of each execution core as its own CPU) is now capable of being over-clocked when the other cores are not being fully utilized.

Intel has also increased the L2 cache by as much 50 percent to keep performance moving. Since L2 cache is several magnitudes faster than the RAM in your PC and infinitely faster than a hard drive, larger L2 cache generally increases performance by reducing the need for the CPU to reach out to RAM or the hard drive.

The new 45nm Core 2 Extreme QX9650 now packs 12MB of L2 vs. the 8MB in the Core 2 Extreme QX6850. Like the previous chip, this new one also operates on a 1,333MHz front-side bus—but a 1,600MHz bump is likely just around the corner.

All of this techno-babble adds up to a cooler, smaller, faster CPU. Our own tests with a 3GHz Core 2 Extreme QX9850 put it anywhere from 5 to 15 percent faster than a 3GHz Core 2 Extreme QX6850 CPU. In-house testing also shows the new CPU to be a very good over-clocker, and we were able run ours up to 3.6GHz without any modifications and a cheap out-of-the box Intel chip cooler. The really bad news for AMD fan boys is that this is Intel's throwaway chip. By late 2008, the company will have its 45nm CPU codenamed Nehalem, which promises to really put the hurt on. Adopting AMD's on-die memory controller and chip-to-chip communication architecture, Nehalem CPUs will feature up to 8 execution cores and a new version of Hyper-Threading that will give each CPU 16 available execution cores.

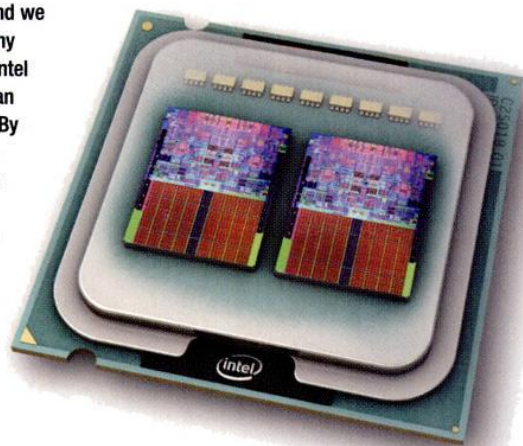
Right now, it's not even a contest; Intel's Core 2 Extreme Q9650 is the top chip to have. If we were looking for something cheaper, one of the company's older, cheaper quad-core CPUs would fit the bill such as the Core

2 Quad series. Ultimate cheap-skates can select from Intel's large portfolio of dual-cores with almost any being a winner. (See chart for price comparisons.)

## AMD

If our section on AMD CPUs seems thin, that's because AMD's product line is pretty anemic these days. For the most part, the company is still sporting the same tired, dual-core CPUs that couldn't compete with Intel two years ago. As much as it pains us, for those looking to build or buy a new PC today based on AMD our advice is "don't bother." There's simply nothing compelling in the AMD stable. You can get a far faster machine today by going with Intel.

The only glimmer of hope is in AMD's upcoming Phenom and Phenom FX CPUs. An updated version of Athlon 64, Phenom/FX will offer what the company touts as "true quad-core computing." Think of it this way: Intel makes its four-leaf clovers by pretty much Scotch-taping a pair of two-leaf clovers together. That sounds



Intel's new 45nm Extreme quad core is the world's fastest x86 processor.



## 8-CORE COMPUTING: OVERKILL?

AMD has FASN8 and Intel has V8, but is the consumer really ready for a dual-processor platform sporting two quad-core CPUs? AMD and Intel believe so, as both are pushing dual-quad-equipped machines to the uber-enthusiast.

AMD started the war with its QuadFX platform last year. QuadFX combined two dual-core Athlon 64 CPUs to make a faux quad-core machine. For the most part, QuadFX was a failure with one cynical insider telling us that the sole maker of the motherboard sold a total of one. That's impossible for us to believe but we agree QuadFX didn't light the world on fire. The problem is the



**Crysis will get a boost from quad-core chips but you probably will be over-doing it with any more horsepower.**

cost, noise, and power consumption that a dual-processor platform incurs.

Not to be outdone, Intel pushed out its V8 platform, which will receive a refresh with "Skulltrail" later this year. Like its predecessor, Skulltrail is noisy, hot, and expensive. For gamers, we're not even sure it's worth the effort. While a quad-core machine is a

must-have today (many triple-AAA titles will actually perform better or play better on a quad-core this year) an eight-core machine is plain overkill. So, unless you convert videos, batch process your digital images, and search for extraterrestrial life while you play a game of Crysis, a dual quad-core box is not worth the effort.



After all the smack talk, the only thing AMD has produced for consumers that sports quad-cores is this pretty logo.

depressed though. AMD does have some interesting parts coming out within the next year or two. The company will have its own 45nm CPUs out by 2009 and the second iteration of those will bring about AMD's Bulldozer core. Bulldozer is a complete redo of its CPU core that will include SSE5 and tools to help software developers fine-tune their code in real time for multi-core computers. Bulldozer will also bring about the first products that are fully integrated with ATI's graphics cores. Many observers expect a "reunification" of graphics processors and CPUs in the coming years, and Bulldozer could mark the way of the future. In fact, AMD's push to combine a GPU with a CPU has helped kick Intel into high gear on doing the same.

In the here-and-now, however, we recommend that you go with Intel. The only exception to this rule is if you are operating on a shoe-string budget. AMD's dual-core processors are priced quite modestly, and the company has done a good job marketing them against the equivalent Intel parts that they can compete against.

pretty ghetto next to AMD's true, four-leaf clovers, which are all designed "and grown" as four-leaf clovers from the beginning.

AMD's approach sure sounds good until you realize that Intel's ghetto-tape-them-together method is still much faster than AMD's best available processor. While we've been able to buy Intel quad-core CPUs for a year now, the best AMD can produce is a logo. Part of the problem is that while a real four-leaf clover may be better than a pair of two-leaf clovers, it's also pretty hard to come across those four-leaf clovers—so the chips have more manufacturing issues, which means it takes longer to produce them.

And that's the problem that may very well be vexing AMD as its quad-core chips are months behind. In fact, while the company has said it would have Phenom CPUs this year (if you define "this year" as 11:59 p.m. on December 31) the top-tier Phenom FX won't be out until sometime next year. To make matters worse, there's speculation that AMD's plans to produce tri-core CPUs may be an effort to reuse a warehouse of "true quad-core CPUs" that have a defective core on them.

We're not here to make AMD fans totally

| MODEL                   | ATHLON 64 FX-74    | ATHLON 64 X2 6400+ BLACK EDITION | INTEL CORE 2 EXTREME X6800 | INTEL CORE 2 EXTREME QX6850 | INTEL CORE 2 EXTREME QX9650 |
|-------------------------|--------------------|----------------------------------|----------------------------|-----------------------------|-----------------------------|
| CLOCK SPEED             | 3GHz               | 3.2GHz                           | 2.93GHz                    | 3GHz                        | 3GHz                        |
| L1 CACHE                | 128KB              | 128KB                            | 64KB                       | 64KB                        | 64KB                        |
| L2 CACHE                | 2MB total          | 2MB total                        | 4MB                        | 8MB total                   | 12MB total                  |
| FRONT-SIDE BUS          | n/a                | n/a                              | 1,066MHz                   | 1,333MHz                    | 1,333MHz                    |
| EXECUTION CORES         | 2                  | 2                                | 2                          | 4                           | 4                           |
| PROCESS TECHNOLOGY      | 90nm               | 90nm                             | 65nm                       | 65nm                        | 45nm                        |
| TRANSISTORS             | 227 million        | 227 million                      | 291 million                | 582 million                 | 820 million                 |
| DIE SIZE                | 230mm <sup>2</sup> | 235mm <sup>2</sup>               | 142mm <sup>2</sup>         | 286mm <sup>2</sup>          | 214mm <sup>2</sup>          |
| PRICE PER 1,000         | \$300              | \$220                            | \$1,000                    | \$1,000                     | \$1,000                     |
| INTERFACE               | Socket F           | Socket AM2                       | LGA775                     | LGA775                      | LGA775                      |
| TDP                     | 125 watts          | 125 watts                        | 130 watts                  | 130 watts                   | 130 watts                   |
| DUAL SOCKET COMPATIBLE? | Yes                | No                               | No                         | No                          | No                          |



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## MOTHERBOARDS

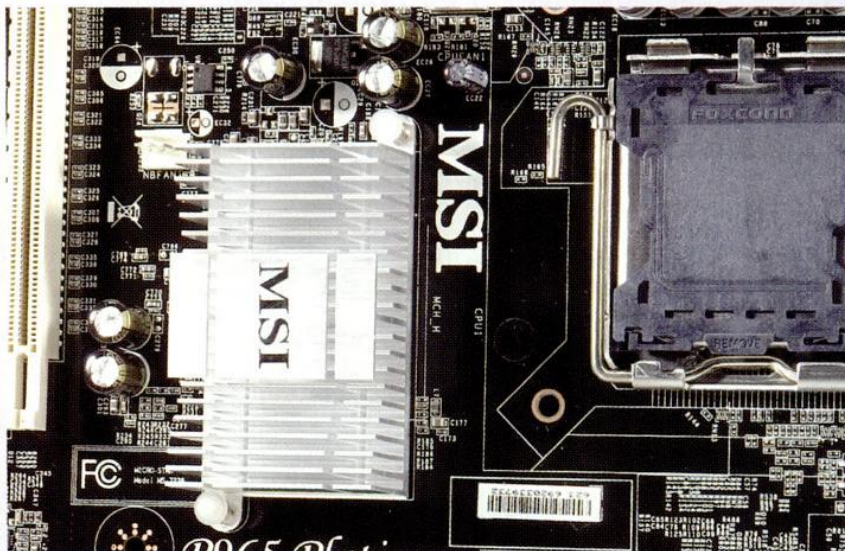
## MOTHERBOARD MADNESS!

Senator, I knew the 440BX, and you are no 440BX!

**E**ven in technology, you can't avoid politics. Sure, everyone knows that if you decide to join either the Intel party or the AMD party you are committed to that party for the life of the motherboard.

But did you know politics are hurting your motherboard's potential? Nowhere is this more apparent than the continuing graphics wars. Most top-end motherboards sport slots that let you plug in two graphics cards, but what you can actually run is limited by politics. Although motherboards using Intel's chipsets are perfectly capable of running two Nvidia cards in the company's proprietary SLI mode, Nvidia drivers don't work with the Intel boards because, well, Nvidia would rather have you buy a motherboard based on its own chipset. Likewise, Intel's relationship with ATI is pretty rocky considering that Intel's rival, AMD, bought ATI two years ago. So, while you can currently run two ATI cards in CrossFire mode on an Intel motherboard, will you be able to two years from now or will politics scuttle driver support?

What we do know is that picking your motherboard is about as fun as navigating a 76-page voter guide the night before the election. So where do you start? First, pick your CPU party: AMD Socket AM2 or Intel's LGA775. Then, think about the graphics you want. If you will never run two video cards, you're good to go and almost any board that you fancy will work. If you may run dual-cards, then you must choose carefully. If you intend to run dual Nvidia cards, go with an Nvidia chipset motherboard such as the excellent EVGA 680i SLI or Asus Striker



The chipset on a motherboard today determines much of the hardware that you can run in the board.

Extreme. If you want ATI (and we're not sure who does at this point) a CrossFire chipset is the safest long-term route.

Ahh, but what about tri-graphics cards or even quad-graphics cards? Yeah, those are in the works too. Both Nvidia and ATI/AMD are about to push beyond just two graphic cards. (Imagine that, Nvidia and ATI/AMD pushing to sell you more videocards. What a shocker.) Because these multi-card setups are so proprietary, we recommend that you stick only with the chipsets that support these modes from each respective company.

Multi-GPU motherboards aren't actually new. Motherboards with four or more x16-long PCI Express slots have been available for years but they don't—and won't—work with these multi-card configurations. Neither ATI/AMD nor Nvidia have announced the names of the new multi-GPU chipsets but they are expected to be available this year.

#### PCI EXPRESS

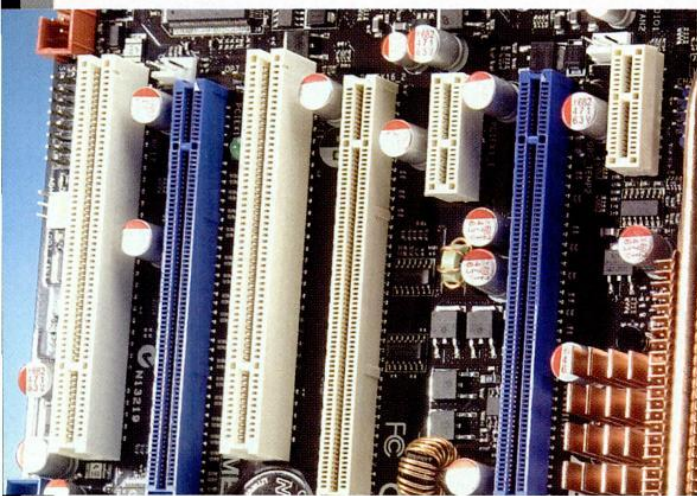
PCI Express quickly supplanted AGP as the graphics slot preference but it hasn't really gotten

much traction beyond use as a graphics slot. Part of the problem is that modern motherboards don't really need anything plugged in anymore. Ye olde motherboards needed expansion slots because everything had to be added, such as audio, networking, USB 2.0, external storage, and Firewire. Today, just about everything that you need is included on the motherboard itself so the only thing that most people add today is the graphics card.

So, you should base your PCI-E setup needs on how you intend to use graphics cards. If you intend to run dual-, tri-, or quad-graphics cards make sure the slots and the underlying motherboard chipset have the requisite support for the mode you want. Today, even moderately priced boards can support either Nvidia's SLI or ATI/AMD's CrossFire mode.

PCI Express is moving ahead though. Intel's new X38 chipset is the first to sport PCI Express 2.0 support. Rev 2 essentially doubles the wire transfer speed of PCI Express so an x16 PCI-E slot goes from 8GB/s to 16GB/s. Is it worth it? Not today. Although there already are PCI-E 2.0 cards on the market, that kind of massive bandwidth just won't be used today or in the near future for games.

Our advice is to pick a board with a minimum of two x16 PCI-E slots and not worry about the rest too much. The only thing you need to pay close attention to is if you intend to run a PCI soundcard. If you do, make sure the board you pick has adequate clearance to run the card as well as your graphics cards.



PCI-E slots will double in available bandwidth with the 2.0 version





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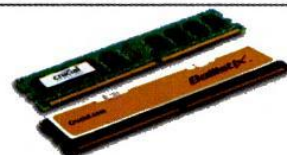
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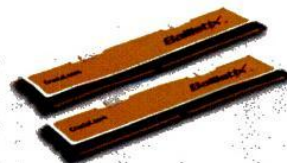
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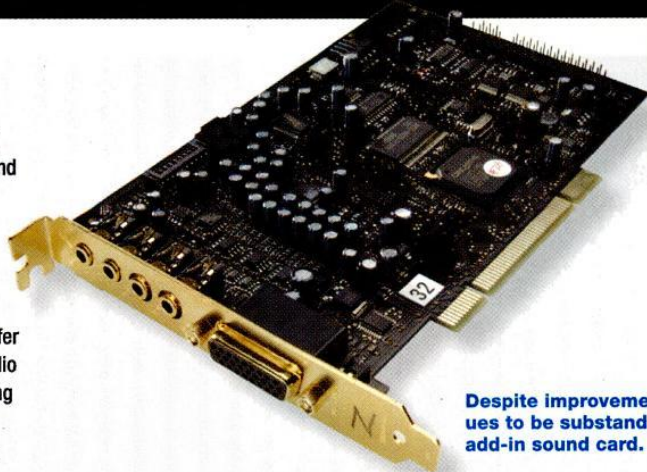
## INTEGRATED AUDIO

The "free" audio in motherboards continues to erode market share away from the add-in sound card but it still isn't up to snuff. If you don't actually care all that much about top quality audio, integrated audio may be fine. However, when it comes to gaming we still want a dedicated sound card (see reviews, page 46).

If you must go the on-board route, we prefer Sigmatel and Analog Devices motherboard audio chips over Realtek. Realtek is still not delivering true EAX effects so we can't recommend its parts. One major shift in the industry: Creative Labs is apparently licensing its X-Fi chip to motherboard vendors so it's possible that we'll soon see a motherboard with X-Fi onboard, which could change our perspective quite a bit. Stay tuned.

## FRONT-SIDE BUS

Because AMD chips don't have a front-side bus, this section doesn't apply to them. However, for Intel folks, this category is a-changing. Intel CPUs sport 800MHz, 1,066MHz, and 1,333MHz front-side bus speeds. The top chips use 1,333MHz, while the bottom-feeders operate at 800MHz. This year we expect to see Intel introduce a 1,600MHz front-side bus for its top CPUs. In fact, many enthusiast motherboards already operate at this speed without any serious side effects.



Despite improvements onboard audio continues to be substandard when compared to an add-in sound card.

At a minimum, though, you want a motherboard that officially supports 1,333MHz and maybe unofficially supports 1,600MHz. Although the increased front-side bus speed will not guarantee a speed increase in all applications, it is akin to building a wider, faster freeway before traffic gets bogged down.

## CPU SUPPORT

Just because you can put a square peg in a square hole doesn't mean it belongs there. Many stores continue to carry motherboards that simply will not support today's newer CPUs. On the AMD side, this isn't as much of an issue as the majority of its chips just plain work. There

motherboard check the manufacturer's website to make sure that it supports the CPU you're going to buy for it. Going to buy a shiny new 45nm Core 2 Extreme QX9650? Make sure the board supports it, and make sure you don't have to flash the BIOS first just to get it to work. In general, Intel P35 and Intel X38 motherboards should work fine. For all others you should check the web.

## FORM-FACTOR SUPPORT

This just in: BTX is *still* dead. We repeat: BTX is still dead. If you want a motherboard, you want ATX. End of story.

## I/O

System I/O has changed slightly during the last year. Most enthusiast motherboards give you 300GB/s SATA, Gigabit Ethernet, USB 2.0, and FireWire 400 ports. However, legacy standards are quickly being pruned back. Parallel ATA devices are down to one port on most new boards and parallel printer and serial ports are pretty much gone. One new I/O port that should be on your motherboard is eSATA, which stands for external SATA. This high-speed storage port is superior to USB 2.0 and lets you run an external drive at essentially the same speed as an internal SATA drive.

## POWER

Modern motherboards have mostly standardized on a single 24-pin main power connector and an 8-pin auxiliary power connector for the CPU. But how much power does your motherboard need? Not much really. However, your graphics cards are sucking down electricity like it's free. Today's top PSU's are rated for an insane 1,200 watts with most of it directed to the graphics cards. The standard connectors today for high-wattage videocards are a pair of 6-pin connectors. However, we do see the 6-pin/8-pin standard catching on. If you're planning on building a tri-card or quad-card rig, you're going to need three or four pairs of 6-pin/8-pin connectors and probably an updated electrical grid for your home too.

## WHAT ABOUT RAM?



DDR3 has the penalty of high cost but its speeds are now far surpassing DDR2's.

DDR2 is the standard memory for all Intel and AMD desktop computer systems today. However, 2008 should see an expanded push for DDR3. The new memory promises higher bandwidth but at the cost of higher latencies. In late 2007, this compromise along with its higher prices made DDR3 seem pretty irrelevant. But we have seen one promise from DDR3 – really high clock speeds. DDR3 modules are already pushing 1,800MHz whereas DDR2 topped out at 1,066MHz. As clock speeds increase, the latency becomes less of an issue. Combined with the higher front-side bus speeds of Intel's new 45nm CPU, we think DDR3 is starting to show some promise. With that said you can't loose with DDR2 and it's pretty darned cheap too.

is one snag though: AMD has quietly pushed out AM2+, which features higher-speed HyperTransport and split-plane power support for improved power management. For the most part, AM2+ is ho-humm, but if we were to buy a new AMD motherboard (people still do that right?) we'd want AM2+ as a feature just in case. The good thing is that while AMD can't deliver a CPU anybody wants today you can at least be confident it'll work in the majority of motherboards out there. AM2+ CPUs are expected to work fine in AM2 boards and AM2 CPUs will work fine in AM2+ motherboards.

That's not the case in Intel land where the safest thing that we can recommend is that before you buy a



## Asus Striker Extreme

It may not be cheap, but it rocks—hard

How much of a badass mother is Asus's new motherboard? It's so bad that it doesn't even use numbers in its name. Yeah, there's no R2-D2-like naming convention here. Just call it Striker Extreme, or El Extremerino if you're not into the whole brevity thing.

The Extreme isn't just about marketing shtick though. Asus has integrated some pretty compelling features into this nForce 680i-based Intel Core 2 motherboard that we hadn't seen before. The best example of this is the LCD poster. Instead of providing a cryptic POST message, the Extreme features a small LCD display that gives you info in plain English.

The I/O shield features electroluminescent lighting, so you can see where your USB or PS/2 ports are. And there are even LEDs that can be safely activated when you work around your PC with it *turned off*. It's scary to muck with parts while the LEDs are lit, but if you push a switch on the back of the board, it cuts power to USB, RAM, and the add-in slots, so you can remove or add components without damaging anything.

More important though, the Extreme gives you more usable slots. With two double-width GPUs installed, there are still enough slots to add a PCI soundcard and a PCI-E card. The onboard sound, which features SoundMax codecs, is even passable. There's no EAX support, but SoundMax still sounds better than the Realtek parts.

## EVGA Nforce 680i SLI

Everything the game enthusiast could ask for

The EVGA 680i has all the features an enthusiast could ask for. It offers SLI with full x16 support. It includes the outbound packet-prioritizing hardware firewall, LAN teaming, and tons of RAID options. And Nvidia's RAID controller lets you change ports on the board from SATA mode to RAID mode without borking your Windows install.

For being EVGA's first 680i mobo, it's pretty well thought out. SATA ports are properly placed so you can access them all even in an SLI setup. The chipset cooler runs in two modes: By default it uses a passive solution, but water-cooling enthusiasts can add the clip-on fan for more cooling performance.

Neither the board-mounted power or reset buttons are new features, nor is the POST LED, but we appreciate the presence of all three. The EVGA board's documentation of POST codes is more thorough than most motherboards', explaining most of the errors you'll see should your system hang. Of course, we still prefer the plain-language boot errors that Asus uses on its Republic of Gamers boards.

Like Foxconn's board, EVGA's mobo features Realtek codecs, which have issues rendering EAX audio. We brought our concerns to Nvidia's attention and the company is looking into the problem. In the meantime, we recommend that you buy a good soundcard if you buy this board.

To judge the performance of motherboards, we use the same hardware setup for each and manually set the RAM timings. Generally, with the same CPU, similar RAM timings, and same graphics drivers, you don't see much variation, even between different chipsets. And true enough,



An LCD display that tells you in English what's going on at POST makes this Asus motherboard outstanding.

On the performance front, the Extreme edges recently reviewed Intel-based boards by a small margin and comes up short only in FEAR. However, all three nForce-based boards we've looked at recently trailed their Intel counterparts in FEAR when run at low resolutions. Everywhere else, this mobo came up smelling of roses.

Price is about the only big issue: The board lists at about \$330 and was going for \$100 more than list as we went to press. That's not Asus's fault though. You can't blame the company for what others are willing to charge for such a damned sexy beast.

ASUS STRIKER EXTREME

• \$330, [www.asus.com](http://www.asus.com)

9

MAXIMUM PC  
KICKASS



The sleek, black PCB, thorough documentation, and over-clocking features make EVGA's 680i board a winner.

we found that while the nForce 680i board leads the pack, it doesn't blow away competing boards.

By offering a combination of solid performance, SLI support, and the ability to run dual- and quad-cores, EVGA's nForce 680i could be the ultimate Core 2 motherboard to have. Our only real concern is longevity. We count on mobo makers to offer BIOS updates for at least two years, but will EVGA and Nvidia have the attention span to push new BIOSes for this board in 18 months? We won't know that until 2008.

EVGA NFORCE 680i SLI

• \$300, [www.evga.com](http://www.evga.com)

9

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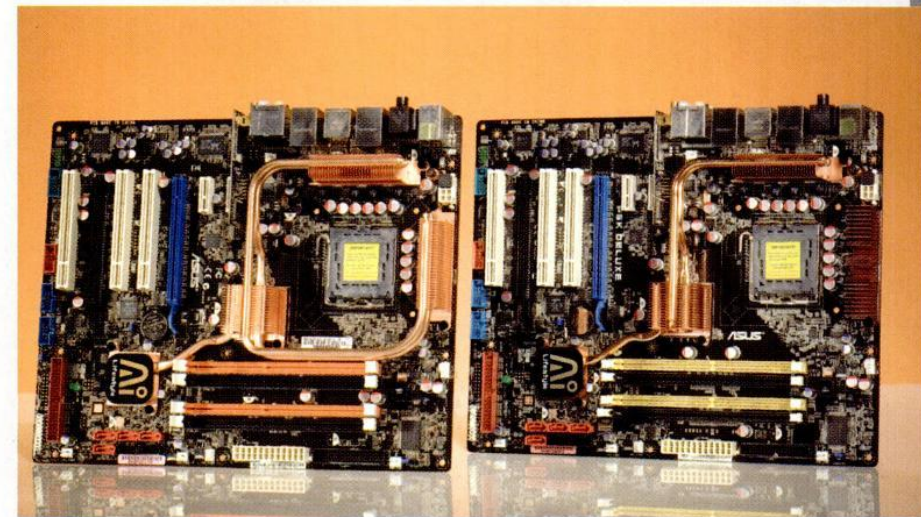
## A Tale of Two Memories

DDR3 is here. Is it worth the price?

You may not be aware of it, but Asus didn't get its bad mofo image for nothing. Able to execute on new chipsets with Terminator-like precision, the company usually beats the competition to market by weeks, if not months. So it was no surprise when a pair of Asus boards using Intel's new P35 chipset arrived at our door well before anyone else's.

The P5K Deluxe and P5K3 Deluxe are almost identical, save for two features: The P5K3 has a slightly bigger heat pipe and the two boards utilize different memory technologies. Asus knows that while DDR3 will generate oohs and aahs, it's also almost twice as expensive as DDR2. The DDR2-based P5K Deluxe is a hedge against the price backlash.

Both boards are loaded with features. They use Intel's new P35 chipset and ICH9R south bridge, which brings official 1,333MHz CPU front-side-bus support to Core 2 users. Also included are beefy heat pipes, dual-gigabit NICs, a pair of eSATA ports, onboard 802.11g Wi-Fi, and a pair of x16 PCI-E slots. The chipset and board are aimed at high-end users but not the ultra-enthusiast market, so one of the x16 PCI-E slots signals at a mere x4 speed. Because this is an Intel chipset,



On the left is the DDR3-based Asus P5K3 Deluxe; the DDR2 version, the P5K Deluxe, is on the right.

SLI is out, but AMD's CrossFire mode is an option. In the good column, both boards use an Analog Devices audio chipset for onboard audio instead of the inferior RealTek codecs found on most boards today.

The real meat here is the DDR3 controller. Intel says the updated controller on the P35 includes fast memory technology to reduce latency and increase available bandwidth. Intel's Robson caching technology, now called Turbo Memory, can also be activated, but we don't know where the flash memory is for the feature. It's certainly not soldered onto either motherboard.

We compared both boards to an MSI P6N SLI Premium using the nForce 650i SLI chipset. All boards used the same components and drivers. Our verdict? Our enthusiasm for these newcomers is tempered by merely good performance. For the DDR2 board, we expected the updated memory controller to outrun Nvidia's nForce 650i SLI, but the Nvidia board did quite well. The nForce board acted both Asus boards in the synthetic memory tests at stock RAM speeds. However, in more practical tests, the performance gap was nil, and the P5K actually pulled ahead in our FEAR tests, which we've seen nForce lose before. The DDR3-equipped P5K3 was more of a disappointment, though. As

expected, the high latency of the DDR3 memory generally put this board in last place, and the latency takes up to a 25 percent hit when running in DDR3/1,333. Ouch.

So should you buy either of these boards? Today, the DDR2 P5K makes a lot of sense. You get very good performance and the safe embrace of an Intel chipset for a decent price. Instead of spending money on DDR3 now, you could buy a faster graphics card or bigger hard drive. Don't write off DDR3 completely however. We were able to overclock the RAM we used up past 1,500MHz, which is impressive since we couldn't get the P5K to run DDR2/800 at 1,333MHz. Still, it's just too early for DDR3. The story will be different next year, but for now, DDR3 is only for people with a taste for champagne and caviar.

—GORDON MAH UNG

### BENCHMARKS

|                                | MSI P6N SLI PREMIUM    | ASUS P5K DELUXE | ASUS P5K3 DELUXE |
|--------------------------------|------------------------|-----------------|------------------|
| <b>CHIPSET</b>                 | Nvidia nForce 650 iSLI | Intel P35       | Intel P35        |
| <b>RAM SPEED</b>               | DDR2/800MHz            | DDR2/800MHz     | DDR3/1,333MHz    |
| <b>SISOFT SANDRA XI (MB/S)</b> | 6,541                  | 6,175           | 6,405            |
| <b>SCIENCEMARK 2.0 (MB/S)</b>  | 6,316                  | 6,279           | 6,243            |
| <b>3DMARK2001 SE OVERALL</b>   | 37,035                 | 36,564          | 36,338           |
| <b>3DMARK2003 OVERALL</b>      | 24,025                 | 23,952          | 23,937           |
| <b>3DMARK2005 OVERALL</b>      | 11,169                 | 11,110          | 11,094           |
| <b>3DMARK2005 CPU</b>          | 8,791                  | 8,795           | 8,768            |
| <b>PC MARK 2005 OVERALL</b>    | 7,211                  | 7,049           | 6,978            |
| <b>PC MARK 2005 CPU</b>        | 5,985                  | 5,982           | 5,941            |
| <b>PC MARK 2005 RAM</b>        | 5,525                  | 5,437           | 5,417            |
| <b>VALVE PARTICLE TEST</b>     | 40                     | 41              | 31               |
| <b>FEAR 1.07 (FPS)</b>         | 198                    | 216             | 199              |

Best scores are bolded. We used a 1.86GHz Core 2 Duo E6300 overclocked to 2.33GHz on a 1,333MHz front-side bus, 2GB of Corsair DDR2 and 2GB of Corsair DDR3, a WD G0740 drive, a GeForce 7900 GTX, a 1KW PC Power and Cooling PSU, and Windows XP Professional. Intel boards were tested with AHCI modes enabled.

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6



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# THE STATE OF THE VIDEOCARD UNION

You've got graphics questions, we've got graphics answers

**T**he videocard industry was in a state of flux as we wrote this buyers guide. Nvidia owned not just the top end of the market, but also the very top of the market. ATI, now owned by AMD, had to settle for third place.

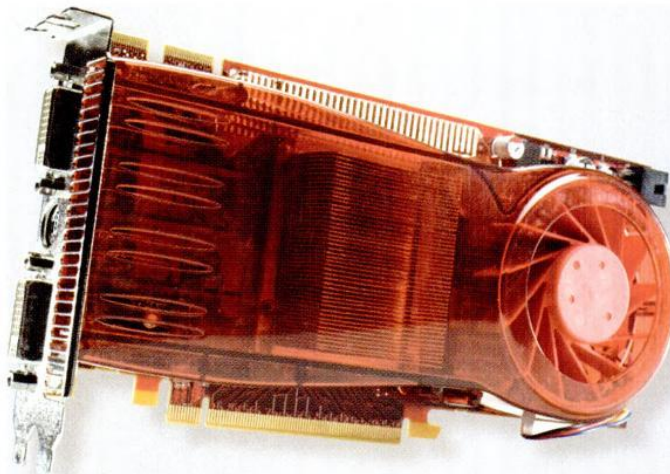
AMD's best effort—the ATI Radeon HD 2900 XT—was slower than both Nvidia's GeForce 8800 GTX and its scorching-fast GeForce 8800 Ultra. Despite an architecture with nearly three times more stream processors than the competition, the Radeon HD 2900 XT is speedier than only Nvidia's third-fastest part, the GeForce 8800 GTS.

As we went to press, AMD was preparing to announce its latest effort to get back into the game. Codenamed RV670 (the HD 2900 XT was codenamed RV600), the new part is manufactured using a 55-nanometer process that should solve two of the RV600's biggest problems: energy consumption and the related heat that requires noisy cooling. But as you'll see from our hands-on preview, it looks as though the new part is not only no faster than the Radeon HD 2900 XT, it's also slower than Nvidia's GeForce 8800 GTS.

Nvidia, for its part, had just announced a new GPU that's also targeted at the mainstream market: the 8800 GT won't replace the Ultra, the GTX, or even the GTS; instead, it looks to be targeted right at AMD's new GPU. Those looking for a new graphics rocket ship might be out of luck this year.

## HD VIDEO DECODING

But gaming performance isn't the only reason that people buy new videocards, and that makes



AMD's next GPU, codenamed the RV670, should resolve many of the complaints that have been leveled at the company's graphics processors lately.

the decision as to which GPU to buy even more confusing. If you've recently invested in a Blu-ray or HD DVD drive and are looking for a card that can offload the brutal decoding effort that those new high-definition standards place on your rig's CPU, you'll need to look at something *other* than the top-shelf cards.

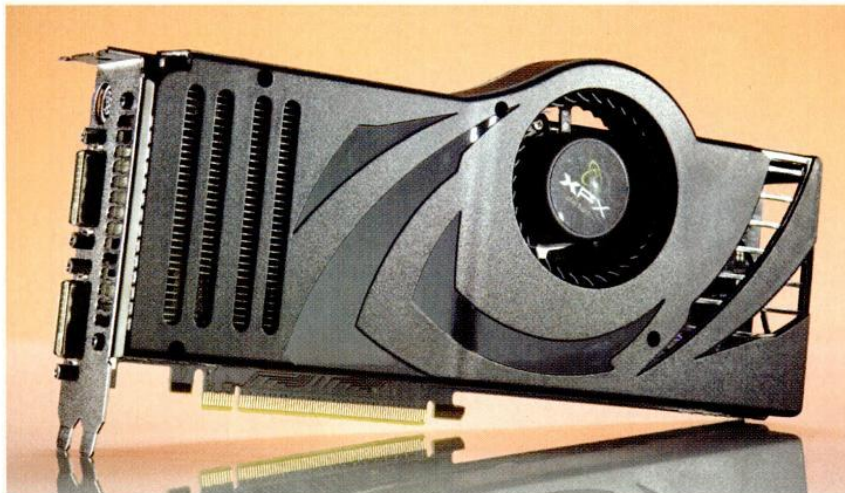
AMD's Radeon HD 2600-series and the RV670 can offload 100-percent of the video-decode work from the host CPU; the HD 2900 series does not have the circuitry for that. You'll run into the same problem if you turn to Nvidia. None of the 8800 Ultra, GTX, and GTS-series cards are capable of this trick; you need to step down to the 8800 GT or the 8600 GTS.

But wait, it gets even more confusing. If you're planning to watch those high-def movies on your fancy new 30-inch panel, your videocard will limit your options here, too. And in this scenario, having a high-end CPU won't do you a bit of good. The problem here is with HDCP, the intrusive copy protection that Hollywood insists on placing in its movies. As you probably know, driving a 30-inch panel at its native resolution of 2560x1600 requires Dual Link DVI. Nvidia decided to put HDCP on only *one* of those links in its 8800 Ultra, 8800 GTX, and 8800 GTS GPUs, so none of those high-end cards will allow the monitor to scale the resolution of Blu-ray or HD DVD movies—you'll need to step down to the GeForce 8800 GT or the 8600 GTS. Here's one area in which AMD enjoys an advantage: Both its 2900-series and the RV670 support HDCP on Dual Link DVI.

If your budget allows you to buy at the high end, a card based on Nvidia's GeForce 8800 GTX is your best bet. Cards based on the 8800 Ultra are faster still, but we just don't think the price delta warrants the added expense. If you have a Blu-ray or HD DVD drive in a rig with a slower CPU, you'll want to buy a card based on AMD's ATI Radeon HD 2900 XT or Nvidia's GeForce 8800 GT (which wasn't shipping at our deadline, so we haven't had an opportunity to benchmark it).

## DIRECTX 10

We thought DirectX 10 would be the one reason to consider holding our noses and upgrading to Vista. While there's no reason why Microsoft could not release DirectX 10 for Windows XP, the company has so far insisted on keeping DX10 and Shader



You'll find an Nvidia GeForce 8800 Ultra on today's fastest videocards, but we don't think it delivers enough bang for the substantial bucks it takes to acquire one.



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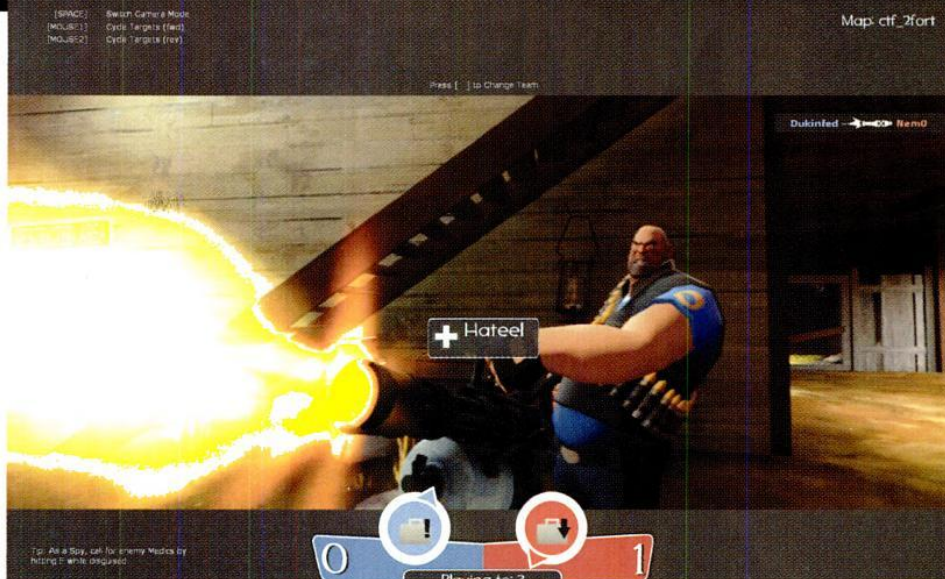
The new API gives game developers the tools to dramatically increase the visual complexity of their games (see story page 78). However, from what we've seen of DX10 games so far there are too few compelling reasons to justify abandoning XP right now for anyone that does not fall into the "must early adopt" category. Vista's slow adoption rate is one reason why developers have been reluctant to move to it. Valve recently released statistics culled from its Steam gaming service that revealed only three percent of its one million anonymous users had machines equipped with both a DX10-compatible videocard and Vista.

"[Microsoft's] decision to couple DX10 with Vista was a mistake," said Valve's director of marketing, Doug Lombardi. "There is no difference between running Orange Box games [Half-Life 2: Episode 2, Team Fortress 2, and Portal] on Vista versus XP, but there are some benefits to having a DX10 GPU."

But this is more than just a chicken-or-the-egg problem. DX10 and Shader Model 4.0 are also more complex to program than DX9 and SM 3.0, and most of the games shipping this year were far along in their development cycles when Microsoft made these new tools available. Lombardi, for example, told us that Valve's developers do make use of the unified architecture that's unique to DX10-class GPUs in order to deliver more sophisticated facial animation in Team Fortress 2, but you don't need Vista for this because they didn't tap DX10 or SM 4.0.

#### UNREASONABLE TRADE-OFF

The few games we've seen that *do* make use of DX10 (both new games and previously released games with DX10 patches) don't look significantly better running under Vista than they do with Windows XP. But what's worse is



Valve's Team Fortress 2 delivers more sophisticated facial animation if you have DirectX 10 hardware—even though it doesn't utilize the DirectX 10 API.

that they run slower on Vista. When we patched the RTS game Company of Heroes and ran it at 1920x1200 resolution in Windows XP (using an EVGA GeForce 8800 GTS with 640MB of memory), we achieved a playable 42.3 frames per second. When we played the same game on the same machine using Vista, frame rate plummeted to a creaky 20.2 frames per second. It would be one thing if the trade-off resulted in supremely better graphics, but we couldn't see any significant differences. We had a similar experience with World in Conflict.

We're not ready to give up on DX10 and Shader Model 4.0 just yet, because there are several highly anticipated games that had not shipped before our deadline that will make use of the new API. The first-person-shooter Crysis (the follow-up to the legendary Far Cry) and the RPG Hellgate: London (from the team that unleashed Diablo 2 on the world) are among the most eagerly awaited (see story page 62).

Microsoft's recent announcement of DirectX 10.1 and Shader Model 4.1 have rendered the situation even more complex.

These new versions will be released along with Vista Service Pack 1, but they're supported only by AMD's and Nvidia's very newest GPUs (we're talking about the 8800 GT and the RV670). So if you thought buying any Radeon 2000-series or any GeForce 8000-series card rendered you future-proof, you're in for a rude awakening.

Microsoft, of course, insists these updates don't render these cards obsolete. "The updated API," said Microsoft's Sam Glassenberg, lead DX10.1 programmer, "provides full support for all existing DirectX 10 hardware and upcoming hardware that supports the extended feature set. The API is a strict superset. No hardware support has been removed in DirectX 10.1." The new API renders mandatory several features that were previously optional. Compliant GPUs must now support at least 4x AA and 32-bit floating-point filtering, for instance.

Considering how slowly both consumers and developers are moving to Vista, we don't anticipate the point releases of these new tools to have much of an impact on the market.



Both of these screenshots were taken from the excellent new real-time strategy game World in Conflict. The screen on the



left uses DirectX 9 shader programs; the one on the right uses DirectX 10. Can you see the difference? (We sure can't.)



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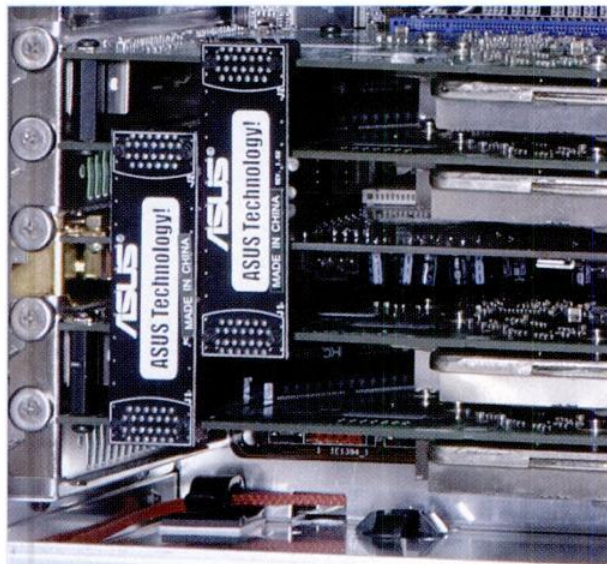
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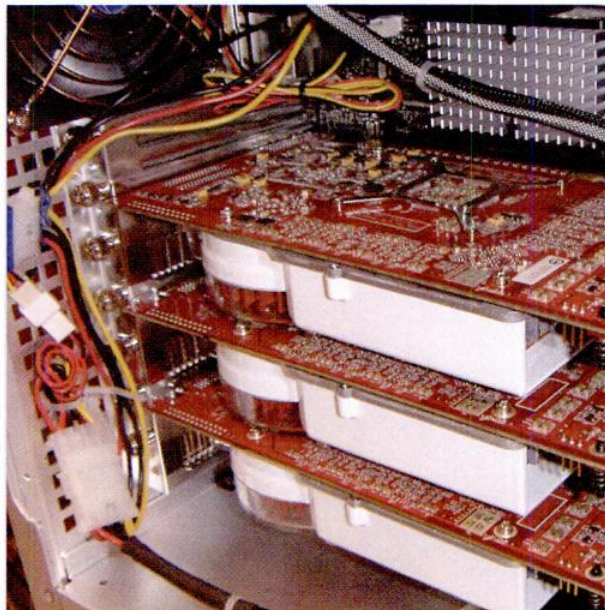
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We thought we'd seen the last of gonzo features like quad SLI, but the technology is poised to make a comeback.



It seems that both AMD and Nvidia have abandoned the idea of using a third GPU for physics acceleration.

#### THE DUAL-VIDEOCARD DUEL

If one videocard can churn out 30 frames per second, two in the same machine should be able to pump 60fps, right? Well, not exactly. Assuming your PC is even capable of running more than one GPU at the same time, the best performance bump you can look forward to is about 80 percent in a dual-GPU configuration. Very high-end GPUs scale much less effectively.

The point is moot, of course, if your motherboard doesn't support running two or more videocards simultaneously—and that means more than simply having a mobo with two or more PCI Express slots. Running multiple AMD ATI Radeon videocards, for instance, requires a CrossFire-compatible motherboard. Doing the same with two GeForce cards requires an SLI-compatible motherboard (the acronym stands for scalable link interface).

It's understandable that you can't chain AMD and Nvidia videocards together—the architectures are radically different—but there's no good reason why you can't mix and match videocards and motherboards. HP, in fact, recently figured out how to do just that with its Blackbird 002 gaming PC (which can be outfitted with two Radeon HD X2900 XT videocards in CrossFire on a motherboard with an Nvidia SLI

chipset). Unfortunately, HP isn't sharing this trick with the rest of us.

Looking on the bright side, both companies support both AMD and Intel CPUs; gaining access to SLI, however, requires a motherboard with an Nvidia chipset. CrossFire support is available with both AMD and Intel chipsets. Both companies' technologies also require that the GPUs on each videocard be identical, although they don't necessarily need to have the same clock speeds or even the same-size frame buffers. You can couple an Nvidia GeForce 8800 GTS with a 640MB frame buffer to a GeForce 8800 GTS with a 320MB frame buffer, for instance, but you can't pair either of those cards with a GeForce 8800 GTX.

#### TRIPLE AND QUAD GPUS

Nvidia launched quad-SLI technology some time ago, but the solution failed to gain much traction in the market: It didn't scale particularly well, it was wickedly expensive, and it was available only in pre-built systems from OEMs. The solution featured four GeForce 7900 GPUs mounted on four PCBs that fit into two PCI Express slots on the motherboard. Nvidia never announced a similar solution for its 8-series products; and as we went to press, there were

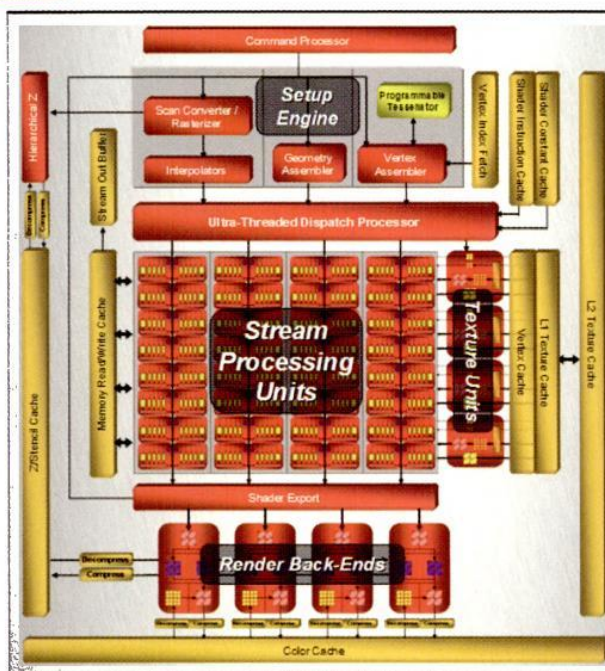
still no Vista drivers available for those rigs.

In the wake of Ageia shipping its PhysX physics accelerator last year, both AMD and Nvidia made a great deal of noise about doing physics acceleration on the GPU. Despite several technology demos, in which a third videocard was used to accelerate physics, this initiative also failed to get off the ground. Now that it's apparent Ageia will dry up and blow away before its PhysX chip takes off, AMD and Nvidia have apparently lost interest in physics acceleration—but they haven't given up on the idea of selling gaming enthusiasts more than two GPUs.

AMD recently announced CrossFireX technology, which will enable three and four videocards to operate in a single motherboard (one with three PCI Express slots, obviously), and Nvidia was making noises about the same thing with SLI. As with Nvidia's quad SLI, all three (or four) GPUs will be used to produce graphics. Neither company had shipped reviewable hardware as we went to press, but we're looking forward to getting our hands on it. With very large monitors becoming increasingly less expensive, gamers need all the graphics horsepower they can lay their hands on.



## VIDEOCARDS



Both Nvidia's 8000-series and AMD's 2000-series GPUs (this block diagram illustrates the ATI Radeon HD 2900 XT) feature a unified architecture in which any or all of the stream processors can be dedicated to executing pixel-, vertex-, or geometry shading operations.

#### VIDEOCARD FEATURES TO LOOK FOR

The boxes videocard come in are filled with mumbo-jumbo touting often obscure features and wildly out-of-context performance numbers. Here are the key features that really matter.

**DIRECTX 10:** The most important thing to know about DX10 is that both AMD and Nvidia GPUs that support it feature a unified architecture. This means that any or all of the processor's computational units (aka stream processors) can be dedicated to executing any type of shader instruction, be it vertex, pixel, or geometry. This renders DX10 compatibility a desirable feature even if you don't plan on running Vista.

**MEMORY INTERFACE:** In theory, a GPU with a 512-bit interface to memory will perform faster than one with a 256-bit memory interface. But don't be confused by AMD's 512-bit "ring bus" memory. That architecture is 512-bits wide internally, but only its high-end GPUs have a true 512-bit memory interface; the company's lesser components have only 128- and 256-bit paths to memory. Inside the GPU, AMD's "ring bus" architecture is 512 bits wide across the board.

But don't judge a card based solely on its memory interface. Nvidia's 8800 GTX and 8800 Ultra are considerably faster than AMD's ATI Radeon HD 2900 XT despite those GPUs having a much narrower 384-bit memory interface.

**STREAM PROCESSORS:** Unlike CPUs, which have one to four processing cores on a single die, modern GPUs consist of dozens of computational units known as stream processors. As with the GPU's memory interface, however, simply counting the number of stream processors doesn't necessarily indicate that one

videocard is more powerful than another. AMD's ATI Radeon HD 2900 XT, for example, is much slower than Nvidia's GeForce 8800 GTX despite the fact that the latter part has only 128 stream processors to the former's 320.

**HDMI:** If you purchased a new big-screen TV, it's probably outfitted with an HDMI port, either instead or in addition to a DVI port. The big difference is that HDMI is capable of receiving both digital video *and* digital audio over the same cable. Videocards based on AMD's new GPUs are capable of taking audio from the motherboard and sending it out through an HDMI adapter that connects to the card's DVI port. With an Nvidia card, audio must be routed to your display or A/V receiver over a separate cable.

**HDCP:** This acronym refers to the copy-protection scheme deployed in commercial Blu-ray and HD DVD movies. In order to transmit the audio and video material on these discs to your display in the digital domain, both the videocard *and* the display must be outfitted with an HDCP decryption ROM. This copy protection is not currently enforced if the signal is transmitted in the analog domain. (See also Dual-Link DVI)

**DUAL-LINK DVI:** Driving a 30-inch LCD at its native resolution of 2560x1600 requires a videocard with Dual-Link DVI, which is relatively common in mid-range and high-end products. What's *not* so common is a videocard that supports HDCP on Dual-Link DVI; without that feature, the maximum resolution at which you can watch Blu-ray and HD DVD movies is 1280x800.

**BLU-RAY AND HD DVD SUPPORT:** As backward as it sounds, high-end videocards are less capable than mid-range videocards when it comes to decoding the high-resolution video streams (H.264, VC1, and MPEG-2) recorded on commercial Blu-ray and HD DVD movies. AMD's ATI Radeon HD 2600 XT and the upcoming RV670 fully offload the decode chores from the host CPU; the ATI Radeon HD 2900 XT do not. On the Nvidia side, the GeForce 8600 GTS and the upcoming 8800 GT do, but the 8800 GTS, 8800 GTX, and 8800 Ultra do not.

**VIVO:** The acronym stands for video in/video out—*analog* video, that is. Most videocards are capable of producing, in order of quality, composite, S-, or component-video that renders them friendly to analog TVs. Support for these types of video input—which useful primarily for capturing analog video from VCRs and older camcorders—is much less common.



**VIVO** (video in/video out) is the one area in which AMD-based videocards continue to trump Nvidia products.



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## First Look: AMD's RV670

Latest GPU draws less power; piles on new features

The good news for AMD is that its new GPU is a much better graphics processor than the absurdly power-thirsty Radeon HD 2900XT that thudded onto the market earlier this year. The bad news is that AMD still can't compete with Nvidia's high-end GPUs.

In fact, the prototype (and immature drivers) that AMD provided us for benchmarking proved to be quite a bit slower than an EVGA 8800 GTS using Nvidia's WHQL drivers. AMD told us it hadn't finalized the clock speeds for the reference-design card, and since Catalyst Overdrive had been stripped from the driver we were provided, we couldn't tell what clock speeds the prototype GPU and its 512MB of memory were running at.

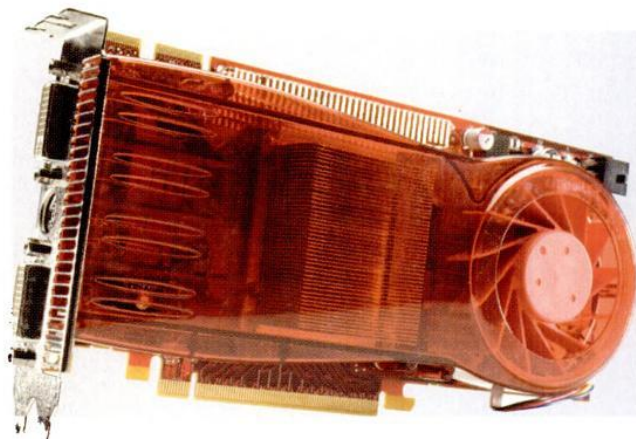
AMD hadn't settled on pricing or even a name for the RV670 before our print deadline (check MaximumPC.com for an update), but reps for the company did tell us there will be two versions of the new chip: An XT with 512MB of GDDR4 memory and a dual-slot cooler (the version we tested), and a Pro with 256MB of GDDR3 and a single-slot cooler. Both parts will have 320 stream processors,

the same number in the 2900XT.

Both SKUs will support a host of new technologies, including PCI Express 2.0, DirectX 10.1, and Shader Model 4.1, and both will be equipped with AMD's Unified Video Decoder. UVD offloads all HD DVD and Blu-ray video-decoding chores from the host CPU. The new SKUs will also support HDCP on Dual-Link DVI so that 30-inch panels can display copy-protected high-definition video at their native resolutions. They'll also support VIVO for analog video editing (another feature Nvidia's hardware lacks).

The new parts will support triple- and quad-GPU configurations, provided you have a motherboard outfitted with AMD's upcoming 7-series chipset and either three or four PCI-Express slots (AMD has dubbed this ATI CrossFireX). AMD promises support for Intel chipsets, too.

Thanks to its 55nm manufacturing process,



AMD's Radeon RV670 could be a major success—if it's clocked and priced right.

the RV670 draws considerably less power than its older cousin. Our prototype card had a single six-pin power connector and drew just 117 watts at idle and 208 watts under load.

We'll reserve final judgment on the RV670 until we get a shipping product. However, the new chip looks promising.

—MIKE BROWN

FIRST LOOK AMD'S RV670

• Price TBD, [www.ati.com](http://www.ati.com)

NA

## PowerColor Radeon HD 2900 XT

AMD trots out its second-gen unified shader architecture

The Radeon HD 2900 XT is indeed faster than Nvidia's 640MB 8800 GTS (but not the insanely fast 8800 Ultra or the only slightly tamer 8800 GTX). It's also street-priced about \$50 higher—but that's about what we'd expect from the faster component. What we *didn't* expect is a GPU that sucks down nearly as much electrical power as an 8800 Ultra while delivering benchmark results that are about 50 percent lower. (The HD 2900 XT requires both a six-pin and an eight-pin cable connection to your power supply.)

Another glaring problem with the 2900 XT is the absence of any driver support for AMD's new Unified Video Decoder, which is designed to deliver hardware support for high-definition video decoding. Without UVD support, the 2900 XT must rely on the host CPU to handle much of this workload.

It's also interesting to observe that the 2900 XT is considerably slower than either the 8800 GTX or the 8800 Ultra, despite having 2.5 times as many stream-processors (320 compared to 128).

Those foibles aside, this card boasts some

impressive architecture, including a true 512-bit memory interface (the best Nvidia can offer is a 384-bit interface, and that narrows to 320 bits for the 8800 GTS that this card competes with). The chip also has a built-in programmable tessellation unit—again, based on technology already present in the Xbox 360—but this feature won't be of much real-world use until it's exposed in DirectX 10. But getting back to the real world, the fact that the stream processors in Nvidia's part are clocked at more than twice the speed of its core didn't help the 8800 GTS outrun the 2900 XT: PowerColor's product delivered single- and dual-card benchmark numbers that were 15- and 25-percent higher than what equivalent 8800 GTS configurations could produce.

The 2900 XT, of course, supports CrossFire—AMD's technology for operating two videocards in a single PC. Color's HD 2900 XT cards running in CrossFire are indeed faster than a single 8800 Ultra, but a pair of those cards will cost you slightly more than a single Ultra.

It would be easy to dismiss this card as a whiff,



Need to capture analog video? The HD 2900 XT is outfitted with VIVO (video-in/video out), a feature Nvidia doesn't offer in its better cards.

but it's really not a bad product, and it'll be a whole lot better if AMD can unlock its UVD circuits.

—MICHAEL BROWN

POWERCOLOR RADEON HD 2900 XT

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8



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## Asus EN8800 GTX

A DirectX 9 screamer

The EN8800 GTX is one powerful videocard. We're not talking marginally faster than the best cards preceding it. We're talking 50- to 100-percent faster than the fastest GeForce 7900 GTX card we've ever tested. We're talking as much as 25-percent faster than two of those cards running in SLI. We're talking fast enough to get impressive frame rates playing *FEAR* at 2560x1600 on a 30-inch panel—with 4x antialiasing, 16x aniso, and soft shadows enabled.

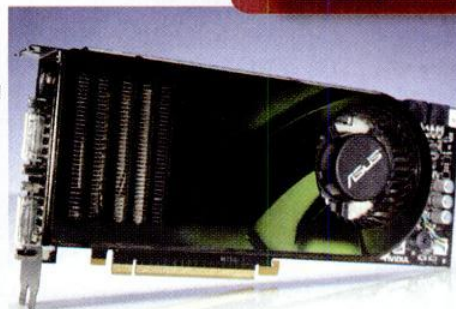
This card is not only faster, it's also more capable than Nvidia's previous best. The high end of Nvidia's 7-series cards were quick for their day, typically hitting high-water marks ahead of ATI's best, but they weren't capable of rendering AA and high dynamic-range lighting at the same time. The 8800 GTX has no such limitation. Nvidia is so proud of this development that it coined a goofy marketing name to describe it: the Lumenex Engine.

Nvidia claims its new processors can deliver 16x full-screen multisampled AA for nearly the same performance hit as older boards took to perform 4x multisampled AA. The new GPU also supports transparency antialiasing to eliminate jagged edges on alpha (transparent) textures commonly used in the rendering of foliage, chain-link fence,

and similar objects. When we put Nvidia's claims to the test, we found that enabling the feature in the driver while dialing the application's AA setting to 4x resulted in much-improved image quality with no more than a 5-percent performance hit. Impressive.

The 8800 GTX supports high dynamic-range (HDR) lighting with 128-bits of precision (32 bits for each color component: red, green, blue, and alpha). Another significant improvement to the GeForce 8800 is its 10-bit display pipeline, which allows the GPU to display more than a billion colors, compared to the 16.7-million color palette that an 8-bit pipeline can deliver. Nvidia is catching up to ATI on this last score, although the price of 10-bit displays keeps them out of reach for most consumers.

The new GPU scores significantly higher on the punishing *HQV* video playback test, too. Nvidia finally decided to give its *PureVideo* software away with the card, unlike with early versions of the product. Enable hardware acceleration in your video-player software and turn on noise reduction in the Nvidia control panel, and you'll be treated to great video playback. But ATI hasn't been idle on the video front, either. After a series of driver tweaks



Asus' EN8800 GTX destroys every DX9 performance record we've seen.

in its latest versions of the *Avivo* software, we now score ATI's high-end cards just a wee bit higher than the 8800.

—MICHAEL BROWN

ASUS EN8800 GTX

• \$660, [www.asus.com](http://www.asus.com)

9

MAXIMUM PC  
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## EVGA e-GeForce 8800 GTS

Sometimes you gotta pay to play

The 8800 GTS is the less powerful of the two DirectX 10 GPUs that Nvidia introduced last November, but we need to put the phrase "less powerful" in context because both parts are based on the same G80 chip. In other words, the 8800 GTS is basically a hobbled 8800 GTX: It offers 96 shader processors (floating-point units that Nvidia refers to as "stream processors"), compared to the GTX's 128; 640MB of memory, compared to the GTX's 768MB frame buffer; a 320-bit memory interface, compared to the GTX's 384-bit interface; and 20 rasterizers, compared to 24 on the GTX.

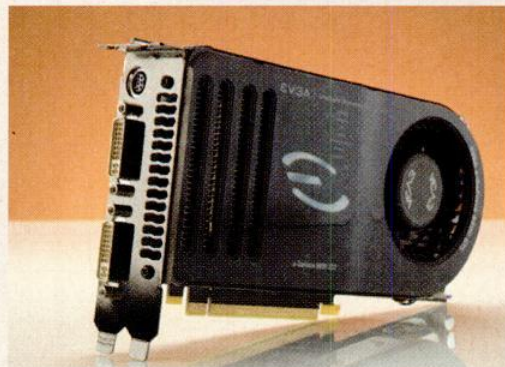
The 8800 GTS also runs at slower clock speeds than its pricier sibling: The GPU on the card EVGA sent us was clocked at 513MHz, compared to 500MHz stock, but the memory was ever-so-slightly underclocked at 792MHz, compared to 800MHz stock. Compare these specs to the GTX's 575MHz core and 800MHz memory. And if you want to drop an HD-DVD or Blu-ray drive into your rig, EVGA's implementation includes the HDCP CryptoROM that Nvidia's NVIO chip needs to display Hollywood movies at their full resolution.

The upside to the 8800 GTS's downsized speeds and feeds is a significantly lower price tag

compared to cards based on the 8800 GTX. If you want a videocard that's capable of delivering DirectX 10 and Shader Model 4.0, there's currently nothing cheaper.

If you are willing to limit yourself to DX9, on the other hand, boards based on AT—, ahem, AMD's ATI Radeon X1950 XTX—also outperform the 8800 GTS. These cards *can* do AA and HDR at the same time, and some vendors are selling them for less than 8800 GTS cards. But it bears repeating that the X1950 XTX is incompatible with DX10 and Shader Model 4.0.

Returning to the matter at hand, the e-GeForce 8800 GTS is no slouch: It delivered *Quake 4* scores of 65.5fps at 1920x1200 resolution, with 4x antialiasing and 16x anisotropic filtering enabled. While that's nearly 33fps slower than the tonier 8800 GTX-based Asus card we reviewed in January, running two of EVGA's cards in SLI boosted our *Quake 4* benchmark to 111fps—12.6fps faster than a single GTX. We obtained similar results with our *3DMark06*, *Company of Heroes*,



The prices for 8800 GTS cards are creeping down, but the absence of competition in terms of DirectX 10 compliance continues to slow their descent.

and *FEAR* benchmarks. Simply put: The 8800 GTS is a helluva GPU.

—MICHAEL BROWN

EVGA E-GEFORCE 8800 GTS

• \$xxxx, [www.xxxxxx.com](http://www.xxxxxx.com)

9

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## VIDEOCARDS

## XFX 8800 Ultra XXX Edition

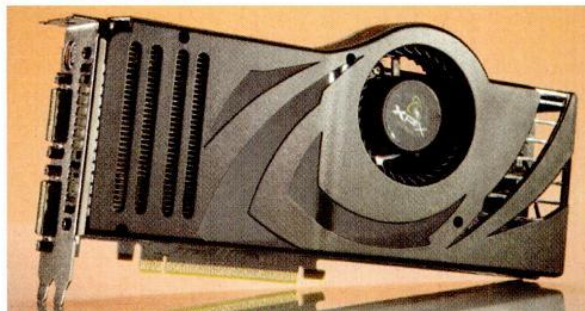
If you have a Corvette, do you need a Ferrari?

ATI and Nvidia have long entertained us with their game of GPU one-upmanship. Each time ATI thought it had a part that could beat Nvidia, Nvidia moved the goalposts. But now that ATI has been reduced to an AMD brand, it seems its engineers no longer want to play.

Nvidia's 8800 GTX was already the fastest consumer GPU on the planet, so what does the 8800 Ultra get you? Virtually the same hardware running at higher clock speeds—insanely higher clock speeds in the case of XFX's XXX Edition. Although Nvidia tells us this is new silicon—and not merely hand-selected parts that proved capable of running at higher clock speeds—the Ultra has 128 stream-processing units and a 384-bit interface to 768MB of memory, just like the older part. It also has a much larger fan to handle the resulting heat.

The core on a stock GTX runs at 575MHz (with its actual shader units clocked at 1.2GHz), and its memory hums along at 900MHz. A stock Ultra is spec'd to run at 612MHz (with a 1.5GHz shader clock), and its memory runs at 1.08GHz. XFX has goosed those rates even higher, cranking its Ultra XXX Edition

up  
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Yes, the 8800 Ultra XXX is fast. It's also crazy expensive and stupid noisy.

speeds with a 675MHz core, a 1.67GHz shader unit, and 1.15GHz memory clock speeds.

But that awesome speed comes at a cost: Until now, we've been pleased with the relative quiet at which Nvidia's GPUs run. The Ultra changes all that—the fan on a single XFX card is loud enough to wake the dead. Put two of them inside a box and you can stir an entire cemetery.

We rarely complain about a component's price if it delivers impressive performance, but we have to draw the line somewhere. The Ultra is spectacular, but then, so is the GTX. And while the average GTX cost about \$585 at press time, the price for this particular Ultra hovered around \$875. Can you say "diminishing returns"?

—MICHAEL BROWN

XFX 8800 ULTRA XXX

• \$875, [www.xfxforce.com](http://www.xfxforce.com)

8

## BENCHMARKS

|                         | ASUS 8800 GTX<br>(STOCK CLOCKS) | SINGLE XFX<br>8800 ULTRA | XFX 8800<br>ULTRA SLI |
|-------------------------|---------------------------------|--------------------------|-----------------------|
| 3DMARK06 GAME 1 (FPS)   | 25.8                            | <b>33.1</b>              | 58.0                  |
| 3DMARK06 GAME 2 (FPS)   | 23.7                            | <b>30.2</b>              | 52.4                  |
| QUAKE 4 (FPS)           | 92.1                            | <b>112.4</b>             | 164                   |
| FEAR (FPS)              | 69                              | <b>95</b>                | 145                   |
| SUPREME COMMANDER (FPS) | 24.7                            | <b>32.4</b>              | 38.6                  |

Best single-card performance scores are bolded. Cards were installed in an EVGA nForce 680i SLI motherboard with a 2.93GHz Intel Core 2 Extreme X6800 CPU and 2GB of Corsair DDR2 RAM.

## Diamond Viper Radeon HD 2900XT

Is a gig putting lipstick on a pig?

AMD's decision not to compete with Nvidia's best GPU left us puzzled, but the decision its manufacturing partners have made—to pair AMD's second-tier GPU with a full gigabyte of GDDR4 memory—has us totally stumped.

We concluded in our August issue that PowerColor's 512MB Radeon HD 2900XT is faster than Nvidia's 8800 GTS, so we weren't surprised to discover that Diamond's card is faster too. But our benchmark testing indicates that doubling the size of the frame buffer—even if it uses fast GDDR4 memory—doesn't improve performance by much, if anything at all. Frame rates certainly didn't increase enough to justify the \$100 price bump over 2900XT cards with 512MB frame buffers.

The GPU on Diamond's card is clocked at the same speed as PowerColor's entry (743MHz), but its memory is set to a cool 1GHz. With the exception of Quake 4, however, we saw an average increase of just one frame per second in our benchmark num-



Diamond's HD 2900XT with 1GB of GDDR4 memory is faster than cards based on Nvidia's 8800 GTS, but you can say the same about much-cheaper X2900XT cards with 512MB of GDDR3.

bers compared to the aforementioned 512MB card.

We suspect the significant boost in Quake 4 performance—which jumped from 75.7fps on the PowerColor card to 86.2fps on Diamond's—has more to do with driver improvements than frame buffer size. Performance increased along the same scale in CrossFire mode, with Quake 4's frame rate benefiting the most (increasing from 127.8fps on the PowerColor card to 146.8fps on the Diamond).

If you use your PC for other high-end applications—such as CAD or 3D modeling—the massive frame buffer *might* do you some good, but those aren't applications we focus on.

—MICHAEL BROWN

DIAMOND VIPER

• \$500, [www.diamondmm.com](http://www.diamondmm.com)

7

## BENCHMARKS

|                       | RADEON<br>2900XT, 1GB<br>GDDR4 | RADEON<br>2900XT 1GB,<br>GDDR4<br>CROSSFIRE | RADEON<br>2900XT,<br>512MB<br>GDDR3 | GEFORCE<br>8800 GTS,<br>640MB<br>GDDR3 |
|-----------------------|--------------------------------|---------------------------------------------|-------------------------------------|----------------------------------------|
| 3DMARK06 GAME 1 (FPS) | <b>22.7</b>                    | 44.1                                        | 21.5                                | 19.4                                   |
| 3DMARK06 GAME 2 (FPS) | <b>21.0</b>                    | 46.6                                        | 20.6                                | 17.8                                   |
| QUAKE 4 (FPS)         | <b>86.2</b>                    | 146.8                                       | 75.7                                | 65.5                                   |
| FEAR (FPS)            | <b>64.0</b>                    | 105.0                                       | 63.0                                | 52.0                                   |
| SUPREME COMMANDER     | <b>28.2</b>                    | 38.7                                        | 28.0                                | 26.2                                   |

Best single-card scores are bolded. AMD-based cards tested with an Intel D975XB2 motherboard; Nvidia-based cards tested with an EVGA 680i SLI motherboard. Intel 2.93GHz Core 2 Extreme X6800 CPUs and 2GB of Corsair DDR2 RAM used in both scenarios.



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## HARD DRIVE HIJINKS

Pick the perfect home for your games

**H**ard drives have improved by leaps and bounds in the last few years, and while a super-fast drive won't improve your frame rate at all, it can certainly help levels load faster and provide more than enough space for all your games, MP3s, and more. The most important features to consider when shopping for a gaming drive are areal density, storage capacity, and rotational speed.

**Areal Density:** Odds are good that you won't see this one written on the box, so you'll want to do a little bit of Internet research before you slap down cash for a new drive. In short, areal density is a measurement of how much storage exists on each platter of a drive. The higher the number, the faster the drive likely is. You calculate this measurement by taking the drive's total capacity and dividing it by the total number of platters in the drive. This gives you a rough estimate of how many gigabytes are on a platter; but again, not all

drives are created equal. Two drives might have identical areal densities, but one of the drives might have some built-in feature that's reining back the speeds: like the additional power-saving modes of Western Digital's Caviar GP, for example.

**Capacity:** The general rule with capacity is the bigger, the better. Though everyone's size requirements are different, we find a safe rule of thumb is 500GB as the minimum for a high-end gaming machine. Drives are available today in sizes all the way up to 1TB, so it's generally true that drives in the 500GB range are in the "sweet spot" in terms of price and capacity. However, prices on the big boys are falling as more competition enters the marketplace. And with areal densities increasing by 40 percent on average each year, the price of 1TB drives is only apt to go down, down, down.

**Interface:** The standard interface has been Parallel ATA (also known as ATA or Ultra

ATA). This interface uses a 40-pin connector with wide, flat ribbon cables; has been around for quite some time now; and traditionally it has been found on all motherboards. However, the parallel interface has pretty much been phased out in favor of a newer, faster interface named Serial ATA, which uses thin cables. SATA's benefits include the fact that you don't have to set jumpers (which is required with ATA devices), and that its smaller cables don't inhibit airflow as much as the archaic ATA cables. There is no reason to buy a drive with anything but a SATA interface today.

**Rotational speed:** Because hard drives operate by rotating a platter underneath a pair of read/write heads to retrieve data, the faster the platters spin, the less time you spend waiting for data to be retrieved. The most common rotational speed for consumer-level hard drives is 7,200rpm, which is the minimum you should accept in a gaming drive.

Hitachi Deskstar 7K1000  
Hard Drive

Whoever said size isn't everything was lying to you, trust us

Hitachi was the first hard-drive manufacturer out of the gate to meet our terabyte-size storage needs. Yes, that's right. A terabyte. One thousand gigabytes stuffed into a hard drive, or in this case, a Deskstar. (Being first also means followers are sure to surpass its performance, see next page.)

For those keeping score at home, that's 250GB more than the current storage leader, Seagate's 750GB Barracuda drive. And while the differences aren't quite as dramatic in terms of speed, Hitachi's 7K1000 storage monster still beats out the Seagate in our HD Tach benchmarks.

The Deskstar 7K1000 drive sports five platters with 200GB of storage apiece, which doesn't give the device an amazing areal density, especially compared to its smaller peers. In theory, drives with a higher areal density perform

## BENCHMARKS

|                     | HITACHI DESKSTAR | SEAGATE BARRACUDA |
|---------------------|------------------|-------------------|
| SIZE                | 1,000GB          | 750GB             |
| RANDOM ACCESS (MS)  | 13.1             | 13.4              |
| AVERAGE READ (MB/S) | 72.7             | 66                |
| BURST SPEED (MB/S)  | 206.9            | 236.9             |

Best scores are bolded.

better, but not so when it comes to the 7K1000. We recorded a whopping 72.7MB/s for the drive's average read



**Cheese and crackers! This drive will hold a load of music, video, and... umm... anything else.**

test, which curb-stomps the Seagate's now-paltry 66MB/s. While Western Digital's Raptor drive tops that score with a random access speed of 77.9MB/s, it's also less than one-sixth the capacity of the 7K1000.

Looking at random access times—a measure of a hard drive's ability to pull information from a variety of different spots on the disks—Hitachi's terabyte drive again tops the Barracuda, by only 0.3 of a millisecond, but a difference nonetheless. As one might expect, the Raptor drive retains its speed-king position. You'd merely need to RAID seven of them together to get the capacity of the 7K1000.

In a comparison of apples and oranges—the Raptor's speed versus the Barracuda's size—Hitachi's terabyte drive is nothing short of a watermelon. It's the fastest of all the drives in its class, of which there is one, and even tops the drives that hover around the meager 500GB mark. Toss in the terabyte of storage, and you get an absolute winner.

—DAVID MURPHY

DESKSTAR 7K1000

• \$400, [www.hitachi.com](http://www.hitachi.com)





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# Showdown at the Terabyte Corral

Western Digital and Seagate join the fray, and they're packin'!

Who doesn't love a healthy dose of 1,000GB in a single storage medium? We sure do, but even more than that, we love competition. The first terabyte drives from Western Digital and Seagate arrived in our Lab within days of each other, and we immediately set out to see if either one could unseat the current terabyte king: Hitachi's 7K1000. Read on to discover what happens when the cutthroat world of extreme storage meets the cutthroat testing of the Maximum PC Lab.

—DAVID MURPHY

## WESTERN DIGITAL CAVIAR GP

We've been waiting with bated breath for Western Digital's entrance into the world of the almighty terabyte. Its Caviar GP drive may have lost the right to stand at the top of the market and yell, "Firsties!" but it is the only terabyte drive built with energy-savings in mind.

The four-platter drive features a number of functions that aim to reduce the drive's total power consumption: The drive modulates its rotational speeds between 5,400rpm and 7,200rpm, unloads

the heads when the drive is idle, and smooths out the normally jittery motions of the actuator in an attempt to minimize wasted juice.

It sounded like junk science to us too, until we compared the power-consumption levels of a Caviar GP-based rig to those of an identical setup that uses Hitachi's 7K1000. A power analyzer confirmed that our Caviar GP rig drew from 7 to 10 fewer watts on average. For a computer that runs at idle all day long, that translates to about 61.32 kilowatt-hours per year. Assuming you're paying roughly 10 cents per kilowatt hour, a Caviar GP could save you about \$6 a year—just enough for a feast at Taco Bell.

The Caviar GP holds its own performance-wise. As expected, though, the drive's emphasis on power-saving costs it a little bit in the speed department. Although improved areal density over Hitachi's 7K1000 helps bridge the gap between the two drives, the Caviar GP still falls short of the 7K1000's impressive read speeds. Of the three terabyte drives we've tested, the Caviar GP is the slowest by far.



Western Digital hopes DIYers are willing to sacrifice a little speed to save the environment—and some cash.

### POWER CONSUMPTION

|                   | WD CAVIAR GP | HITACHI 7K1000 |
|-------------------|--------------|----------------|
| IDLE (W)          | 144          | 151            |
| BURST (W)         | 147          | 152            |
| RANDOM ACCESS (W) | 149          | 160            |

Best scores are bolded. All voltage measurements taken using an Extech Power Analyzer.

### WD DIGITAL CAVIAR GP

• \$330, [www.wdc.com](http://www.wdc.com)

7

## SEAGATE BARRACUDA 7200.11

With new teams entering the terabyte storage market, it was only a matter of time before one smacked down the great Hitachi 7K1000 1TB drive. That distinction goes to Seagate's 1TB Barracuda 7200.11 drive.

The Barracuda and Western Digital's Caviar GP are virtually identical in terms of features: same 32MB cache, same 7,200rpm rotation speed, same 512 bytes per sector. The Barracuda and Caviar GP



Unconstrained by power-saving techniques, Seagate's Barracuda delivers speed, speed, and more speed—but no extra features!

drives also use four platters (250GB apiece) to hit their 1TB capacities, unlike Hitachi's 7K1000, which uses five platters. This difference in areal density proves to be a fatal flaw for Hitachi's drive, and the Caviar GP's speeds are constrained by its focus on energy savings.

The result? Seagate's 7200.11 terabyte drive is the fastest we've yet tested in the Lab, hands down. It doesn't come with any additional features—no encryption, no power-savings, no backup—just speed. Although we'd welcome the others, speed is our primary concern.

### BENCHMARKS

|                     | WD CAVIAR GP | SEAGATE 7200.11 | HITACHI 7K1000 |
|---------------------|--------------|-----------------|----------------|
| BURST (MB/S)        | 214.4        | 131.3           | 206.9          |
| RANDOM ACCESS (MS)  | 14.9         | 12.7            | 13.1           |
| AVERAGE READ (MB/S) | 66           | 86.6            | 72.7           |

Best scores are bolded. All benchmarks taken using HD Tach 3.0.1.0. Power Consumption

### SEAGATE BARRACUDA 7200.11

• \$330, [www.seagate.com](http://www.seagate.com)

9

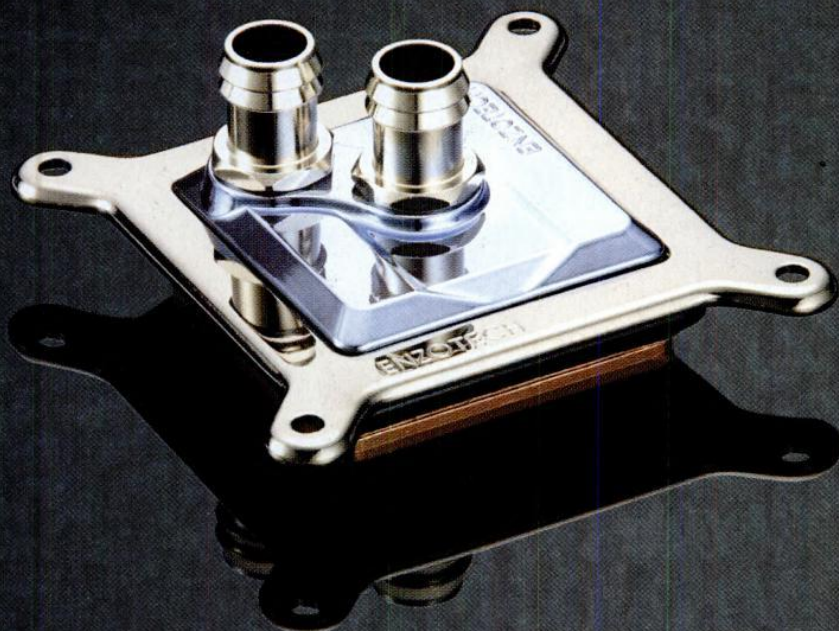
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## ENZOTECH

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## OPTICAL DRIVES

## PICK THE PERFECT OPTICAL DRIVE

The latest technology isn't necessarily the best buy—consider your needs carefully

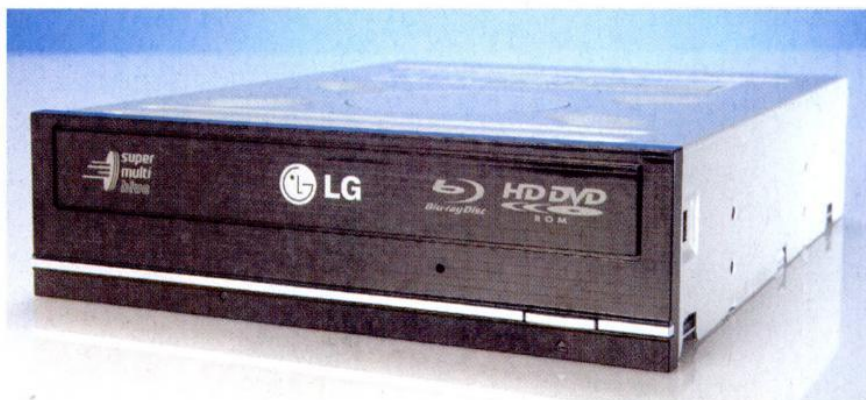
## NEXT-GEN OR NOT?

It's understandable if the ongoing war between the two competing "next-gen" formats—HD DVD and Blu-ray—has you feeling confused about your next optical-drive purchase. But should either format even figure into your decision at this time?

For starters, a next-gen burner is a big investment. Prices have certainly dropped in the last year, starting at \$1,000 or more a year ago and now resting at half that amount today. And that trend is sure to continue, so it may be worthwhile to wait for a while longer.

Yes, these drives are uniquely capable of burning huge amounts of data to a single disc (25GB per layer for Blu-ray and 15GB per layer for HD DVD), but the media is also quite pricey, running \$12 to \$15 dollars per single-layer disc and twice that for double-layer media. If data backup is your primary concern, an external drive might be more cost-effective purchase. And transfer times will certainly be more speedy, as even the fastest HD drive we've tested (LG's GGG-H20LI Super Multi Blue) takes more than 21 minutes to fill a 25GB disc—that's not speedy, folks.

Indeed, the majority of your disc-burning needs might best be handled by a good, old-fashioned standard DVD drive. High-performance models, capable of speedy 18x burns, can be had for less than 100 bucks. And DVD media is itself very affordable. This can be a compelling stop-gap measure while you wait for "next-gen" optical to come into its own.



For \$500, LG's GGG-H20LI (see review, page 44) gives you the fastest available Blu-ray burns at 4x—and it's able to read both Blu-ray and HD DVD discs.

## BLU-RAY VS. HD DVD

OK, so you really, really want the very latest in optical drive technology—prices be damned. So which of the two next-gen formats should you opt for?

That's an easy one. As of this writing, the only stand-alone consumer high-def burners available are of the Blu-ray variety. While there are plenty of HD DVD players to be had, burners for this format remain elusive. This will likely change in the coming year, at which time price, burn speeds, and the latest status in the format wars would determine our preference for either HD DVD or Blu-ray.

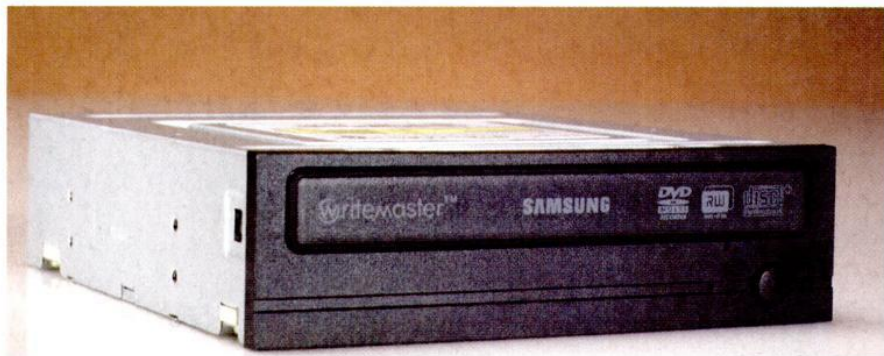
## COMBO DRIVES

The majority of Blu-ray burners offer CD/DVD read and write capabilities as well. But LG also has drives that feature both Blu-ray and HD DVD support. As we said before, HD DVD burning is currently unavailable except in rare OEM instances. But LG's GGG-H20LI Super Multi lets you read both Blu-ray and HD DVD discs (so you can watch any high-def commercial DVD you choose) as well as write to Blu-ray, DVD, and CD.

Or you can skip the Blu-ray writes altogether and get LG's GGG-H20L (\$400), which lets you read both high-def formats but only write to DVD and CD.

## INTERFACE

Regardless of whether you go old-school or next-gen, you should look for an optical drive with a serial ATA (SATA) interface. Not only is the parallel (PATA) cable much more large and unwieldy to deal with inside a case, support for the PATA interface is being phased out by a number of manufacturers. Most notable among them is Intel, which no longer includes PATA support in its motherboard chipsets, leaving it to board manufacturers to add it themselves.



Samsung's SH-S203B might be an old-school optical technology but it takes care of all our burning needs quickly and efficiently and costs just \$70.



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## OPTICAL DRIVES

## LG SUPER MULTI BLUE GGW-H20LI

The argument for adopting next-gen optical is getting slightly more persuasive

It's no surprise that high-def optical drives are getting less expensive while their specs improve—that's the trajectory of all emergent technologies—but we are still taken aback by the dramatic strides LG's GGW-H20LI represents. Just a few months ago, in our September issue, we reviewed this drive's predecessor, the GGW-H10NI, and not only is its follow-up better in every respect, it's half the price!

Granted, at \$1,200 the earlier model was priced out of the stratosphere—consumers paid a premium for its unique ability to read both HD DVD and Blu-ray media (while writing to just the latter). The GGW-H20LI also offers this convenience.

### BENCHMARKS

|                                        | LG GGW-H20LI | LG GGW-H10NI |
|----------------------------------------|--------------|--------------|
| DVD WRITE SPEED AVERAGE                | 12.09x       | 6.67x        |
| DVD READ SPEED AVERAGE                 | 9.24x        | 7.61x        |
| ACCESS TIME (RANDOM/FULL)              | 99ms/192ms   | 190ms/374ms  |
| CPU UTILIZATION (8X)                   | 23%          | 30%          |
| TIME TO BURN 22.5GB TO BD-R (MIN:SEC)  | 21:23        | 27:27        |
| TIME TO BURN 22.5GB TO BD-RE (MIN:SEC) | 39:38        | 45:11        |

Best scores are bolded. All tests were conducted using the latest version of Nero CD-DVD Speed and Verbatim media. Our test bed is a Windows XP SP2 machine, using a dual-core 2.6GHz Athlon 64 FX-60, 2GB of Corsair DDR400 RAM on an Asus A8N-SLI motherboard, an ATI X1950 Pro videocard, a Western Digital 4000KB hard drive, and a PC Power and Cooling Turbo Cool 850 PSU.

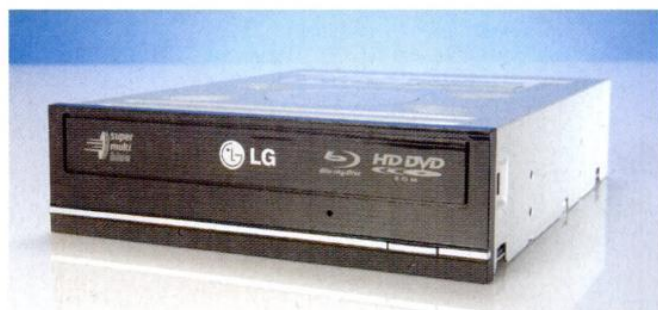
## SAMSUNG SH-S203B

A new DVD burning champ is crowned

Ever since Plextor stopped manufacturing the PX-755SA DVD burner, we've been on the hunt for a worthy replacement. We loved the Plexy's SATA interface, so we're not settling for anything less going forward. (It's just plain foolish to opt for a drive with an oversized, outdated parallel connector when SATA models are available.) Since SATA drives from Lite-On and Asus failed to win us over in our August issue, we corralled a couple new contenders: And Samsung unseats our perennial favorite Plextor in this category: Yes, ladies and gentlemen, we have a new DVD King.

Samsung's DVD burner didn't waste any time strutting its stuff: In our first burn test, in which we fill a single-layer DVD+R disc, the SH-S203B turned in a time of 5:00 (min:sec) flat. That's a Lab record, folks, and proof that the burner's 20x DVD+R write rating pays off. We saw a similarly speedy score of 5:06 from the Lite-On 20x burner we reviewed in August ([www.maximumpc.com](http://www.maximumpc.com)), but only when we used pricey, hard-to-find Taiyo Yuden media. With Verbatim media, that drive's 5:49 burn time doesn't even come close to Samsung's.

We expected great things from Samsung's double-layer performance as well, given its 16x write rating for DVD+R DL. And sure enough, the burner blew away the competition by writing 7.96GB of data to a disc in 13:10—that's a good four minutes faster than any other drive we've tested. The SH-S203B turned out a time of 14:31 when writing 4.38GB to a DVD+RW disc—a respect-



Bundled with Cyberlink's PowerDVD, the GGW-H20LI lets you play both Blu-ray and HD DVD movies.

Plus, it offers a welcome speed increase for Blu-ray burns. Rated at 6x for BD-R media, the GGW-H20LI took 21:23 (min:sec) to write 22.5GB to a single-layer disc in our tests. That's a 6-minute savings over this drive's 4x predecessor. (Frankly, we were expecting to see more savings, since the 4x drive nearly halved the times of its 2x competitors, but we'll take what we can get.) We saved just about 6 minutes when writing to rewriteable media as well, with the GGW-H20LI filling a single-layer BD-RE disc in 39:38.

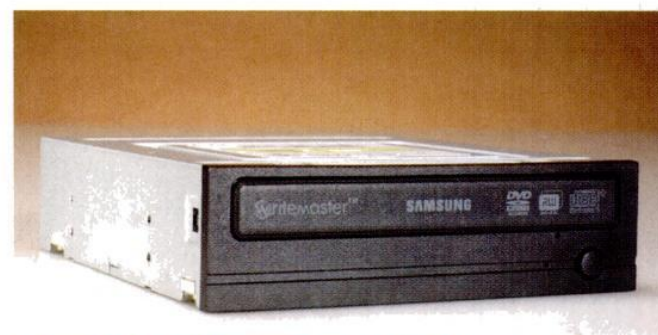
But really, given the high cost of Blu-ray media (\$12 to \$15 per single-layer disc), not to mention the still-lengthy burn times, this drive's DVD performance matters as much or more to most users. Rated at 16x, the GGW-H20LI took 5:40 (min:sec) to fill a single-layer DVD+R, while its predecessor took more than 10 minutes. Even dedicated DVD burners aren't much faster—the Samsung SH-S203B, our pick for "Best of the Best"—took 5 minutes to complete this task.

It's reign might not last long, but for now the GGW-H20LI is the fastest, most versatile high-def optical burner available and made all the more attractive by its handsome façade and SATA interface.

—KATHERINE STEVENSON

LG SUPER MULTI BLUE

• \$500, [www.lge.com](http://www.lge.com)



Samsung's SH-S203B doesn't look all that different from the competition, but it stands out plenty in performance.

able showing for rewriteable media.

Based on performance alone, we're smitten with the SH-S203B, but Samsung sweetens the deal further with 48x CD-R burn speeds, support for DVD-RAM, and a host of Nero apps, including Nero Express 7, Nero BackItUp, and Nero Recode. Looks like we've found ourselves a new fave.

—KATHERINE STEVENSON

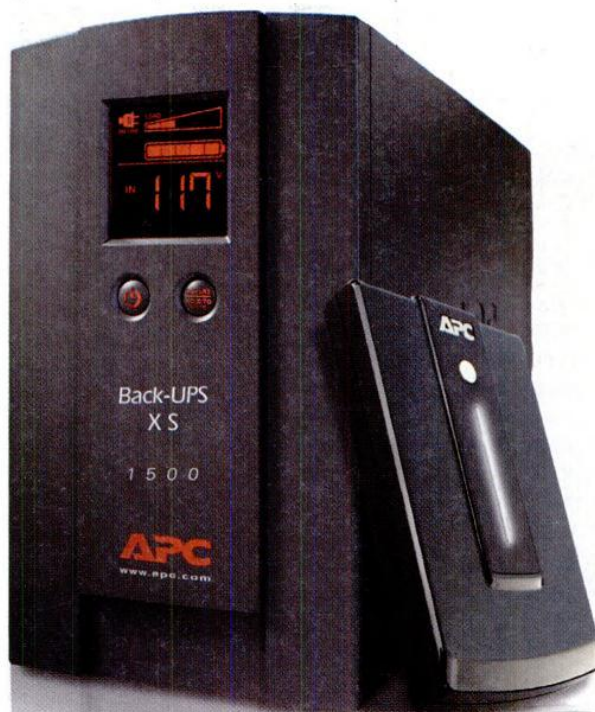
SAMSUNG SH-S203B

• \$70, [www.samsung.com](http://www.samsung.com)





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in time to save your gear from imminent destruction. You should also check out the UPB10, for those times when you're away from home and need to recharge and add runtime to get you through the game.

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## Add-in Audio: Not Dead Yet

If you want true aural ecstasy, you still need a soundcard.

For years, the soundcard looked as though it was headed to join the scrapheap along with the Ethernet card, USB 2.0 card, and Firewire card. Oddly, a recent renewed interest in soundcards indicates that this dog may still have a little hunt left in it. Creative Lab's X-Fi has been the premier soundcard but entries from Asus, Auzentech, Razor, and others have recently been introduced for PC enthusiasts. Why

run a soundcard instead of the "free" onboard stuff on your motherboard? The main reason is because it simply sound better. Onboard audio's biggest weakness is sharing the same space as the other electrically noisy components on a motherboard. This leads to the snap, crackle, and humming that most people associate with bad audio. Onboard audio also has a weakness in that most motherboard companies' strengths aren't in making good audio; they just need to have it fulfill a checkbox on the packaging.

Today, gamers are faced with two choices: hardware audio-processing or host-based. There's only one soundcard series with hardware support: Creative's X-Fi (and Auzentech's authorized copy). X-Fi cards will actually process the complex math for audio on the digital signal processor (DSP) on the card. Newcomers, such as Asus' Xonar or Razor's

Barracuda AC-1 actually process the math on the CPU and use the soundcard as little more than a glorified I/O card to pass the audio signal out of the system to your speakers. The argument for the X-Fi cards is that they will put less of a load on the CPU and thus, theoretically, increase frame rates. For the most part, we've found this to be true. However, with quad-core computers becoming the norm, is the soundcard even really working that hard?

Host-based soundcards are actually quite good and offer features that DSP-equipped cards cannot, such as real-time encoding of content to Dolby Digital. For those looking to use the PC with a home entertainment system, a card like the Asus Xonar is a better fit than the X-Fi.

There's also been a push to include ever more satellite speakers in soundcards with 5.1 going to 6.1 and now 7.1 audio. While additional speakers do help, we don't find it practical to run seven speakers around our PC. Plus, support for 7.1 and 6.1 audio in speakers tends to be mismatched with not all systems working quite right. The sweet spot for someone looking for a good surround-sound experience is still a 5.1 speaker setup. The good news is that cards that tout 7.1 support also work fine with most 5.1 speaker sets.

If games are the main application you consider when it comes to sound, your choice remains simple: Creative's X-Fi (see reviews on next page).



**The last of the soundcards? Creative's X-Fi is the last soundcard standing that still actually includes any audio processing capabilities in the card.**





# Soundcard Sound-off

Tired of hearing data move across your USB bus thanks to your onboard audio? These soundcards will bring a smile to your ears

And you thought the soundcard was dead? OK, maybe it's been beaten black-and-blue, thrown out of the ring, and had a folding chair smashed over its head, but it just keeps coming back for more—like Indiana Jones.

But just between you, me, and the 8800 GTX card, the soundcard is still far superior to anything we've ever heard mounted on a motherboard. So sit back and listen, Dr. Jones.

—GORDON MAH UNG

## RAZER BARRACUDA AC-1

We're impressed when companies go above and beyond reference designs for products. Razer's Barracuda AC-1 is such a product.

The AC-1 gives you a proprietary DVI-like connector that you can directly connect to the Razer's HP-1 headset (or your standard speakers using the included dongle). And the AC-1 features dual optical ports, but this card is definitely intended for gaming. And that's where it gets interesting. The CMI8788 isn't a DSP, like the X-Fi, it's more of a super I/O chip that passes data from the PCI bus to the various components on the AC-1 at a very efficient clip.

Most of the filtering for 3D effects, including Dolby and other processor-intensive chores, is done on the computer's CPU. In FEAR, for example, the X-Fi's DSP gives it about a 10 percent frame-rate advantage over the other cards in analog mode. (Dolby Digital encoding adds even more overhead to the Razer card, but the X-Fi is incapable of real-time DD5.1 encoding.)



The X-Fi XtremeGamer Fatal1ty Pro Series is essentially the original two-year-old card without the extras.

We've been wondering if our stance against host-based audio was outdated in the age of multi-core CPUs, but a 10 percent hit is still painful—it's like dropping the CPU down a rung or two.

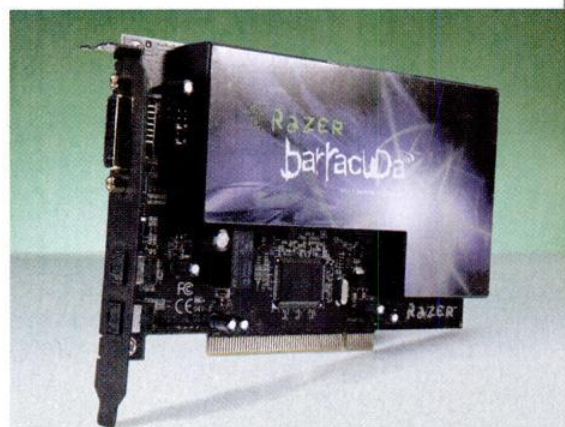
Of course, the DSP doesn't always work against the AC-1. In 3DMark03, which uses simpler audio routines, the AC-1 performs the same as or better than the X-Fi. Performance could also improve if the drivers for the AC-1 were multithreaded.

In gaming fidelity, the AC-1 fared well in our tests, with one exception. In Battlefield 2, we noticed dropouts in audio. We suspect it's a problem with the chipset or its drivers that is induced by the tremendous amount of audio BF2 throws at you.

Where does that leave the AC-1? At \$200, it's pretty expensive. In fact, the AC-1 costs more than the X-Fi with its fancy schmancy (and so far useless) onboard X-RAM. It doesn't help that the AC-1 lacks OpenAL support and sounds inferior to the Creative card in many of the games we tested.

### RAZER BARRACUDA AC-1

• \$200, [www.razerzone.com](http://www.razerzone.com)



The Barracuda AC-1 features a proprietary DVI-like connector that can be used with Razer's multichannel headphones.

of power." We don't know how true that 10K figure is, but in our tests, the X-Fi remains the boss, especially when compared to the CMI8788, which is nothing more than a glorified I/O chip. In FEAR with graphics options cranked down and audio options cranked up to emphasize soundcard performance, the X-Fi led by 10 percent across the board.

Of course, a good soundcard isn't just about frame rates. In close listening using reference-quality earphones, two Maximum PC editors favored the X-Fi's bottom-end push while listening to a variety of 24-bit audio.

We also give the edge in gaming fidelity to the X-Fi, as the subtle audio cues in games (in particular, Battlefield 2) stood out with this card. This may be due in part to the developer-relations money Creative spends to help developers utilize its technology. Most top games today support Creative's OpenAL initiative, which is the only way to get hardware-accelerated positional audio in Microsoft Vista.

Although we think the X-Fi is the best of the cards tested here for general PC use, the real-time Dolby Digital encoding of the two other cards and optical SPDIF make them far better suited for home theater use. We must also note that the now-defunct XtremeMusic version of this card can still be found and is a better value. But for gamers, the X-Fi is the best choice.

## CREATIVE LABS X-FI XTREMEGAMER FATAL1TY PRO

If you read our original review of the X-Fi way back in November 2005, you already know about this card. Back then, Creative packaged this exact same card with a drive bay and remote and charged an impossible to justify \$280 for the X-Fi Fatal1ty FPS soundcard.

We ended up recommending its cheaper sibling, the X-Fi XtremeMusic instead.

Fast-forward a year and a half, ditch the remote and drive bay, and you've got the XtremeGamer Fatal1ty Professional Series priced at \$130 less than the original. But does the X-Fi age like a fine wine or a punch-drunk palooka? For Creative, it's pure vino!

Unlike the other two boards we tested here, the X-Fi continues to use a true DSP with "10,000 MIPS

### X-FI XTREMEGAMER FATAL1TY PRO

• \$150, [www.creativelabs.com](http://www.creativelabs.com)





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HIGH PERFORMANCE GAMING NOTEBOOKS



# THE GREAT CASE CONUNDRUM

Make sure you give your new components a happy home!

**T**hough most people upgrade videocards and hard drives on an annual basis, they rarely upgrade their PC case, unless tragedy strikes. The reason is simple: The ATX specification for cases has been around a long time, and it's still getting the job done. Simply put, there's usually little reason to upgrade unless you're looking for more room, more cooling or a more pleasing aesthetic. Indeed, these are the most important characteristics of a case: it must be able to hold all your hardware, and have enough fans to keep everything cool and relatively quiet.

**Case fans:** All cases include some sort of cooling system, though whether or not the actual fans are inside the case at the time of purchase varies. Regardless, every case has fan mounts, and it's important to see what size they are prior to purchase. We typically favor large 12cm fans because they spin slowly, and therefore are rela-

tively nice and quiet—and move a lot of air. You'll want to make sure there's a fan in the lower front of the case to suck air into the PC, and a nice, big fan in the back to blow it out. Some fans include exhaust fans on the top or side of the case, too, but these aren't always necessary and can add a lot of unwanted noise.

**Form factor:** The lion's share of consumer-level motherboards conform to the ATX specification, so make sure the case in question supports this standard (most do). Once you know it supports ATX, the only big question left is, How big do you want to go? There's mid-tower cases, which are the size of what most consider to be a "regular" desktop, and there's full-tower cases, which are much larger and longer than a mid-tower. Though their size makes them unsuitable for frequent transport to LAN parties, full-size towers are a breeze to work in given their cavernous interi-

ors. They can also hold a lot of hardware, which is nice if you have several hard drives, are running SLI, or are thinking about investing in water cooling. For most users, however, a mid-tower will be more than sufficient.

**Front-mounted connectors:** This feature used to be resigned to USB ports mounted on the front of the case, but with Firewire and eSATA making headway in the market, you're going to want a case that gives you at least two of these connectors to play with. And one should be eSATA — its speed benefits destroy anything Firewire or USB-based, making it a perfect connection for that external backup drive of yours. Be sure to pay attention to the location of these connectors, as sometimes they're on the bottom-front of the case, and other cases put them right at the top, which is nice if your PC is resting on the floor.

## Zalman Fatal1ty FC-ZE1

Sturdy, stylin', and not cheap

The Fatal1ty-branded FC-ZE1 case is one heckuva sturdy container for your electronic essentials, but it'll take a railgun to your bank account. We're just a little hesitant to recommend the FC-ZE1 to everyone: The case is covered with logos and labels, and accessing the internals is somewhat awkward. But if you're shopping for a new case, Fatal1ty's design comes pretty close to flawless.

Getting your gear into the FC-ZE1 couldn't be easier—sort of. While the left side of the case features an easy-access toolless door, in order to access the right side you must bust out the included Allen wrench. It's a hassle when you want to access the 5.25-inch bays.

Irritating as that is, we pepped up after seeing that our hard drives would rest in the case's snug, noise-reducing chassis. Three aesthetically pleasing red fans round out the deal, sucking air in and out of the case while giving the insides a smooth, ambient light.

There's a lot of branding on Fatal1ty's case, but it's still a sleek looker with a durable design.

ZALMAN FATAL1TY FC-ZE1

•\$370, [www.zalmanusa.com](http://www.zalmanusa.com)

9

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## CASES

## CoolerMaster Cosmos

Big, bold, and beautiful

We tipped our reviewing hand when we chose this case to house this year's Dream Machine. But that's just how sweet the Cosmos is. This case looks as good as it functions, and there's nary a blemish in either area. More important, the case retains enough of a unique look and feel to distance itself from the bevy of generic models we frequently see.

You don't need to grab a screwdriver to make major changes to any parts in the Cosmos case (aside from the motherboard). The five front 5.25-inch bays use an awesome push-button locking mechanism that, to date, is the best we've come across. Tiny thumbscrews hold the six hard-drive trays in place—an elegant improvement over standard drive bays.

The Cosmos caters to the water-cooling crowd with its ready-for-a-radiator ceiling grills, but lovers of the air won't be left out. A detachable 12cm fan bunker pulls in air from the bottom of the case, and a plastic bar running horizontally across the case draws cool air right into the videocard area. Strangely, there's no airflow across the hard drives in this case, one of the very few oversights we were able to find with the Cosmos.

A lack of functioning drive-activity lights on the case's front panel is another stinger, but it's not enough to destroy the taste of this sweet, sweet chassis.



The Cosmos's smooth, foam-backed side panel is awesome, but we wish Cooler Master had included a side window as well.

COOLER MASTER COSMOS

• \$200, [www.coolermaster.com](http://www.coolermaster.com)

9

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## Thermaltake LanBox VF1000SWA

For those on-the-go gamers

At first glance, Thermaltake's Lanbox case looks like an absolute dud. Not because of its design but rather its size. What's the point of buying a case that won't fit, say, a GeForce 8800 GTX card?

So let us first rest your troubled heart. Yes, you can stuff a modern rig into the Lanbox. A rig based on a micro ATX or mini ITX formfactor, mind you. It's a tight fit, and you might have to get a little creative with cable management, but a sweet, easily totable rig is not an unobtainable dream.

That said, the Lanbox's design is an utter success. There's just enough space for all the essential parts of a gaming rig, and the presentation is as artful as it is simple. Toss the case's three fans into the mix and it's obvious that Thermaltake understands its market. Almost.

Building your machine takes a lot of screw-work, which is forgivable, considering the case's size. We can't overlook the lack of "1337," however—with no window etchings, no crazy paint job, and only one LED fan, this case isn't going to impress anybody at a LAN party. Come on, Thermaltake, where's the bling?



The Thermaltake VF1000SWA is the awesome offspring of a six-pack and a computer case.

THERMALTAKE LANBOX

• \$160, [www.thermaltake.com](http://www.thermaltake.com)

8





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## CASES

## Antec P190

An old favorite made better

If all the world's computer cases were playing a game of Battlefield, then the Antec P190 would surely be one of the tanks. This thing is a monstrosity of a midtower, though functionally, it differs very little from everything else in Antec's P-series of cases.

However, this case does add improvements we've been dreaming of since we first laid our hands on the P180. The P190 comes with that extra bit of horizontal space that makes all the difference in the world if you rock extra-long videocards. Previous models were just too cramped—even if you weren't using a water-cooling system.

We love how two in-tandem power supplies are included in this beast: a 650W device for your motherboard and cards, and a 550W one for everything else. That said, cable management is still an issue with the P190. To its credit, Antec continues to try to find better ways to route or otherwise minimize the impact of the snarl of cables shooting out of the southern chunk of the case. But the design still feels wrong, especially when you have to route your cables through a tiny rabbit hole, over a fan, and back through a hole just to get to the lower drive bay.

At least the case's airflow is totally unrestricted, thanks to the whirling power of four 12cm fans and a beastly 20cm side-panel fan. They're all tri-speed fans too; perfect for the air enthusiast who's trying to keep his hearing intact.

## SilverStone Temjin TJ10

Why didn't they call it the TJ09 Part 2?

The ongoing joke at *Maximum PC* is that SilverStone releases a new TJ series case but once a year. Like the arrival of Punxsutawney Phil, the Video Music Awards, and the Dream Machine, this glorious event is marked with celebrations and drunken revelry—only this time around, instead of booze, we're tipping back kegs of awesome. SilverStone's TJ10 case is a welcome addition to the company's strong dynasty of chassis. Like its father before it, the TJ10 is polished and almost perfect... almost.

We'd normally take this paragraph to gush over the TJ10's design, but we've already done that—just read December 2006's review of the TJ09 case ([www.maximumpc.com](http://www.maximumpc.com)). Functionally, the two are almost identical. The TJ10 differs in only one minor aspect—the large fan mount attached to the side of the hard drive bays is now notched, giving you a place to rest your extra-long graphics card. And that's all she wrote, folks.

Since we last looked at a SilverStone case of this magnitude, however, a number of vendors have devised features that surpass those in the 9 Kick Ass—scoring TJ09. For example, Cooler Master's Cosmos case redefined our notions of screwless with its handy door-removal mechanism and push-button locks for its 5.25-inch bays. Antec's P190 is the supply depot of cases, with its two included power supplies and five fans. And the Zalman FC-ZE1 case? It's a tank—a freakin' tank.

In a perfect world, SilverStone would have included some kind of rails—even dinky plastic ones—so users could mount hard drives and peripherals without screws. We also would love to have seen screwless holders for the PCI cards. Filling all of the bays with fans would have been a pleasant touch that surely wouldn't have shot this \$300 case's price tag



It's big. It's black. And it's back. Antec's P190 case smoothes out some wrinkles but ever so slightly misses receiving a Kick Ass award.

ANTEC P190

• \$500, [www.antec.com](http://www.antec.com)

9

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The TJ10 does a great job cooling your components, although including a fan near the hard drive bays would have been a welcome touch.

through the roof. And still, no eSATA on the front panel connectors?

The TJ10 is still a rockin' case, but old age has started to creep up on this old faithful. Perhaps we'll see some innovation come this time next year.

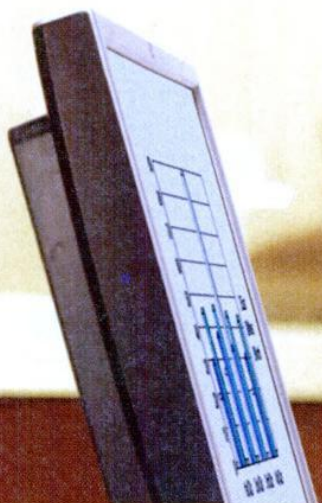
—DAVE MURPHY

SILVERSTONE TJ10

• \$300, [www.silverstonetek.com](http://www.silverstonetek.com)

8





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## PICK THE PERFECT DISPLAY

Before you plunk down the cash for your next monitor, know which specs matter and which are bunk

**SCREEN SIZE:** This figure is the size of the LCD panel measured diagonally from corner to corner. Desktop screens range in size from 15 to 23 inches and beyond. We consider 19 inches the minimum for all-purpose computing. You need at least that much screen real estate to work in multiple windows comfortably, and to thoroughly enjoy high-definition video and PC games.

**ASPECT RATIO:** A display's aspect ratio is its screen width divided by its height. The majority of desktop monitors have an aspect ratio of 4:3, regardless of their screen size; and the majority of software applications and computer games are designed accordingly. This is something to bear in mind if you're considering a wide-screen model, which typically has an aspect ratio of 16:9. If content, such as a game, insists on a 4:3 ratio, the display will stretch the content to fill the entire screen, making everything look fatter than it should. This situation is becoming less of a problem every day, as most games support at least one widescreen mode that won't look distorted.

**NATIVE RESOLUTION:** Every LCD sports a fixed number of pixels arrayed in a grid that is a certain number of pixels high and a certain number of pixels wide. The native resolution is the width of the display (in pixels) by the height (in pixels). The native resolution will deliver an optimum picture. While it's possible to run an LCD at a lower, non-native resolution, the image will be rescaled and the display will use interpolation to fill in the missing pixels, which can degrade image quality. Native resolution and interpolation quality are of particular concern to gamers, who often run games at low resolutions to get the best frame rate.

An LCD's native resolution is typically determined by its screen size. For example, many 19-inch monitors have a native resolution of 1280x1024, while many 20-inch models have a native resolution of 1600x1200. A higher resolution makes everything look smaller on-screen, but also gives you more space on your desktop.

**INTERFACE:** Today's LCDs connect to the graphics board via either an analog VGA connector or a digital DVI connector. If your graphics board is equipped with DVI outputs—most modern boards are—we recommend you use DVI to connect to your LCD.

Unlike CRTs, which must refresh every pixel on the screen 60-plus times a second, LCDs modify pixels only when they change. The analog connection is less precise because the digital information must be converted to an analog stream in order to travel to the LCD, where it is then analyzed and converted back to a digital format. This is a recipe for data loss or corruption in the image that is ultimately displayed on-screen.

**CONTROLS:** The degree to which you can adjust an LCD's picture via the onscreen display (OSD) varies among monitors: in some cases, you have fewer options with the digital interface because the manufacturer cheaped out. Adding hardware to the display that allows the user to manipulate the image detracts from the manufacturer's bottom line. We think it's important to have at least some control over color, brightness, and contrast.

**PIXEL RESPONSE TIME:** This spec has been getting a lot of play lately, so it

deserves mention. A pixel's response time, measured in milliseconds, describes the time it takes for a pixel to change from its on state to its off state and then back on again. If the response time is too slow, you'll see ghosting and other artifacts because the display's pixels can't keep pace with the information sent from the graphics card. This problem is particularly noticeable in games, which tend to have fast action sequences.

A response time of 25 milliseconds was once the norm, but it's not uncommon these days to see response times listed in the single digits. As impressive as this spec sounds, it should be taken with a grain of salt. Different manufacturers report response times differently, so this spec isn't a reliable means of comparing different brands. Some vendors report only the pixels' rising (turning on) or falling (turning off) time; others report how long it takes for a pixel to turn on, turn off, and then turn on again; and still others report the time it takes for a pixel to go from peak white to full black. (Pixels change from white to black much faster than they change from gray to gray, but the latter is a much more common occurrence in real-world use.)

Because of this inconsistency, we don't normally report on a display's pixel response time, but we mention it here to illustrate a point: Response-time specs often do not jibe with qualitatively measured performance. The best way to determine an LCD's abilities with fast-paced content, in our opinion, is to eyeball it first-hand.

**ERGONOMICS:** Obviously, the more ability you have to adjust your screen's height, tilt, and orientation to fit your body, the better.



# Gateway XHD3000

Finally, a 30-inch LCD that's made for power users

When we reviewed 30-inch desktop LCD monitors from Dell, HP, and Samsung back in May 2007, we were left saddened by the large-screen state of affairs. These monstrous widescreens offering unparalleled 2560x1600 resolution seemed like the perfect fit for power users—if not for their inherent limitations. Unlike high-performance desktop LCDs of lesser size, these 30-inch panels lack an internal scaler (and Apple's 30-inch Cinema Display is no different). The problem is that conventional monitor-scaling technology isn't powerful enough to drive these screens' 2560x1600 pixels.

As a consequence, the 30-inch panels are all restricted to a Dual Link DVI interface; they offer no onscreen display options, such as contrast, color, or even color temp adjustments, and if your videocard doesn't carry HD digital copy protection (HDCP) over a Dual Link signal (and most don't), you're forced to watch copy-protected high-def content at 1280x800 resolution (half the screens' native res).

Back in May, we predicted the situation would be remedied in time—we just didn't expect it to happen so soon, and certainly not by the likes of Gateway. But perhaps it's precisely because Gateway has fewer resources, and thus a smaller development team and less bureaucracy, that the company was able to see a solution outside the box. That solution is the Silicon Optix HQV Teranex Realta video processing chipset. Capable of performing a trillion operations per second, this video processor has previously been found only in broadcast-industry equipment and high-end home-theater gear, but its pixel-by-pixel algorithmic scaling now serves to make Gateway's XHD3000 the most flexible 30-inch desktop LCD around.

For starters, the XHD3000 features an array of interface options (see spec box), so you can not only connect to the monitor with a variety of different cables but also have multiple devices hooked



While the major monitor manufacturers were busy churning out the status quo, Gateway was pushing the envelope.

up to the screen at once. Then you can switch between, say, your gaming console, laptop, DVD player, cable box, and PC (with each source set at a different resolution) using the onscreen display menu—accessible via touch-sensitive buttons on the monitor's bezel—or the included remote control. Picture-in-picture functionality gives you access to two content sources simultaneously.

The scaler also makes it possible for you to adjust the screen's brightness, contrast, and color, regardless of interface. Bundled EZTune software offers similar options, with the aid of step-by-step adjustment and calibration instructions. It also offers some additional PiP preferences, including the option to make a PiP window invisible with a simple mouse rollover.

The XHD3000 is unique in yet another respect: It offers decent built-in audio. We're usually loathe to even mention the presence of a monitor speaker because we don't want to encourage any reliance on tinny, underpowered audio, but the eight transducers that span the XHD3000's front-mounted speaker bar are capable of producing fairly rich sound at high volume. It doesn't deliver the same bass response as a good stand-alone set of speakers, but it's a worthwhile option if you want to save desk space.

Of course, the meat and potatoes of any display is screen performance, and

here, too, Gateway's on it. The XHD3000's black looks inky, and a completely dark screen reveals only slight signs of backlight at the corners; grayscale reproduction is strong, showing clear distinction of shades at the extreme light and dark ends, and the picture holds up when viewed off-axis.

The screen is capable of playing HDCP-encumbered content at its intended res and the results are impressive. Gaming is also a pleasure on the screen's wide expanse. A powerful PC will let you play at the screen's native res, but there's no harm in scaling the res down for faster frame rates. Either way, the screen's pixel response keeps pace with the gaming action.

You'd think that with all the extras it offers, the XHD3000 would be more expensive than the competition. But it's not. In fact, it's priced lower than 30-inch models from Samsung, HP, and Apple and is only slightly more expensive than Dell's 30-inch. If you're after maximum screen real estate and ultimate usability, the XHD3000 is well worth the shekels.

—KATHERINE STEVENSON

## SPECS

|                   |                                                                                                                            |
|-------------------|----------------------------------------------------------------------------------------------------------------------------|
| NATIVE RESOLUTION | 2560x1600                                                                                                                  |
| INTERFACE         | Single and Dual Link DVI, HDMI, Component, Composite, S-Video, VGA, USB 2.0 (six ports), audio inputs for all video inputs |
| HIGH-DEF SUPPORT  | 1600p, 1080i, 1080p, 720p, 480i, 480p                                                                                      |

GATEWAY XHD3000

• \$1,700, [www.gateway.com](http://www.gateway.com)

9

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## DISPLAYS

# 24-inch Triumvirate

Authoritative screens for the everyman

Clearly, the LCD sweet spot these days is at 24 inches, where you can get in on the big, wide 1920x1200-resolution action for well under a grand. Your biggest problem will be choosing from the multitude of models. Our current 24-inch fave is Dell's 2407WFP (reviewed September 2006). But let's see how three of its competitors fare.

—KATHERINE STEVENSON

## DOUBLESIGHT DS-240WB

DoubleSight is best known for its two-in-one monitor solutions, such as the dual 19-inch display we reviewed in March 2007, but we'll take a single seamless 24-inch screen over that option any day. The DS-240WB looks all business with a simple but sturdy black frame. Its telescoping neck lets you adjust the screen's height, plus you can tilt, pivot, and rotate the screen's orientation. Input options consist of one VGA, one DVI, and one audio input. To access the whole gamut of onscreen display (OSD) options, you'll



**To get the most out of DoubleSight's LCD, you'll need to use the analog interface—that sucks.**

need to use VGA. For instance, you can adjust the screen's individual color channels and even its overall color tone only with the analog interface; DVI limits you to contrast and brightness changes.

This LCD also favors VGA when it comes to displaying HDCP-encumbered content. But that's only because content producers haven't clamped down on the analog stream—yet. Simply put, this LCD lacks HDCP support, so if movies are impor-

tant, beware.

Otherwise, the DS-240WB performs well. It aced our Display Mate ([www.display-mate.com](http://www.display-mate.com)) scripts, it captured the nuances of our high-res digital photos, and it held up to the rigors of action gaming. Still, in our minds it's lacking.

DOUBLESIGHT DS-240WB

• \$550, [www.doublesight.com](http://www.doublesight.com)

7

## GATEWAY FPD2485W

Gateway's 24-inch LCD stands out in this crowd by offering far and away the most input options: VGA and DVI ins are joined by S-video, composite, and two component connectors, as well as four USB 2.0 ports. This LCD, however, also sports the most annoying OSD. Menu selections are accompanied by sound effects that are reminiscent of a Casio keyboard's. And while there's a healthy array of menu options to choose from, none appears to disable the menu's audio. Twitchy touch-sensitive OSD buttons certainly don't help matters.

The FPD2485W performed adequately in Display Mate, but the screen did show signs of banding in grayscale of 85 steps or more, particularly at the dark end of the spectrum. We looked for evidence of this shortcoming in our high-res digital photos, concentrating on subtle transitions in shades, but found no apparent flaws. We were also satisfied with the screen's abilities with movies, including those with HDCP, but its game performance was unacceptable. An obvious and persistent flicker and other signs of digital noise seemed indicative of a screen that can't keep up with rapidly changing content. Not good.

GATEWAY FPD2485W

• \$580, [www.gateway.com](http://www.gateway.com)

5

## NEC MULTISYNC LCD2470WNX

NEC's LCD2470WNX doesn't offer quite as many input options as Gateway's LCD, but it splits the difference between that monitor and the DoubleSight, with VGA, DVI, and four USB 2.0 ports. Like the other



**Gateway's FPD2485W reminds us that not all modern LCDs are up to gaming.**

LCDs reviewed here, it provides the full range of ergo options—height, tilt, swivel, and rotate. The OSD, for its part, is fairly simple to navigate and includes the same variety of options whether you're using the digital or analog interface. What's more, it doesn't squawk at you.



**NEC's LCD2470WNX: In this case, you do get more for your money—just not enough.**

Like Gateway's screen, the NEC showed some banding in the more extensive grayscale, although to a lesser degree. And since that issue didn't hurt Gateway's real-world performance, it's not surprising that NEC's screen fared well with our sample photos. The LCD2470WNX's built-in HDCP support let us watch high-definition movies on its big screen and its pixel-response performance kept pace with our games, although there was a hint of ghosting in high-contrast areas.

Overall, the LCD2470WNX is nice, but not as nice as Dell's more feature-rich, less expensive 2407WFP. **MPC**

NEC MULTISYNC LCD2470WNX

• \$800, [www.necdisplay.com](http://www.necdisplay.com)

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# Gaming Accessories

What's the point of a killer rig if you skimp on the extras?

## GAMEPAD

### Xbox 360 Gamepad

Are you fed up with Xbox 360 owners waxing poetic about their new controller—how durable it is, how comfortable it is, how much better it is than a PC gamepad? Well, now you can shut 'em up by buying an Xbox 360 controller for your PC.

The Xbox 360 controller uses a standard USB connection, so the corded version is compatible with both the Xbox 360 and the PC. Note: A wireless version is available, too.



XBOX 360 GAMEPAD

• \$39.99, [www.microsoft.com](http://www.microsoft.com)

8

## JOYSTICK: CASUAL

### Cyborg Evo Force

This stick has it all: force-feedback effects, rudder twist, plenty of programmable buttons, a stylish look, and a fair price! Heck, you can even customize the stick for right- or left-handed use! This stick will suit your needs for everything from arcade to driving and flying games. Non-FF wired and wireless versions are also available.



XBOX 360 GAMEPAD

• \$70, [www.saitekusa.com](http://www.saitekusa.com)

8

## GAMING MOUSE

### Logitech G5 2007

It's difficult to describe how incredibly smooth the G5's action is. When used with a Teflon-coated mousepad, it's the nearest thing to frictionless you'll find this side of Dupont. The mouse glides effortlessly across the surface, tracking with pixel-perfect precision. Its surface is slightly textured for easy grip, and all buttons are well placed for in-game action.



LOGITECH G5 2007

• \$70, [www.logitech.com](http://www.logitech.com)

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## RACING WHEEL



### Logitech G25 Racing Wheel

If you play driving games, you owe it to yourself to pick up this wheel. It's pricey, but you get your money's worth. How do stainless steel and real leather construction, simple installation and programming, and true 6-speed manual shifting—with brake, clutch, and gas pedals—sound to you?

LOGITECH G25 RACING WHEEL

• \$300, [www.logitech.com](http://www.logitech.com)

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## HEADPHONES

### Alienware Osma 7 Headphones

People are always asking us what our favorite headphones are for gaming, and right now the Osma 7's are tough to beat. Sure, they ain't cheap, but if you're serious about your gaming, and your rig is armed with the latest in audio hardware, they are a worthwhile investment. Trust us!



ALIENWARE OSMAS 7 HEADPHONES

• \$200, [www.alienware.com](http://www.alienware.com)

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## SPEAKERS

### Logitech Z-5500 Digital

For going on two years now these are still our favorite 5.1 gaming speakers. The drivers in the satellites produce killer treble and midrange, and the gargantuan subwoofer will rattle your windows! The elegantly designed tethered remote control features a huge, weighted control wheel and a bright LCD display. **MPC**



LOGITECH Z-5500 DIGITAL

• \$400, [www.logitech.com](http://www.logitech.com)

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# 9 GAMES THAT WILL PUNISH YOUR PC

DirectX 10 games are finally here, and they're all that we've been waiting for. But even the upcoming games using older tech look gorgeous. Here's the scoop on this year's latest and greatest titles

BY WILL SMITH

**N**ever has there been a better time to be a PC gamer. This year's crop of games delivers all the pulse-pounding action we've come to crave beneath a candy shell of glorious graphics—the likes of which we've never seen before. Leading the graphics charge is a bevy of DirectX 10 titles that will stress a system to its limits, and the promises long made by proponents of the Games for Windows initiative are finally starting to show fruit.

What's more, even DirectX 9-level titles are taking advantage of the prodigious power available in today's high-end graphics cards to deliver experiences that look better than we ever thought DirectX 9 capable of.

So, to all console ever-lovin' folk who are claiming for the *n*th time that PC gaming is dead, we say, "Shut your pie holes!" We can't wait to kick back in our office chair, embrace our mouse and keyboard, and get our game on!







CROWD SURFER

# Assassin's Creed



You take a contract, find your target, and kill him. It's that simple. Except it's not. Instead of another modern-day version of Hitman, Ubisoft: Montreal has created a medieval Agent 47 who makes his way through the sandbox that is Crusades-era Jerusalem.

The catch is that you're a free-running assassin, and your biggest problem isn't the mark firing arrows at you or the town constabulary, but rather the thronging crowd filled with beggars, merchants, and other townsfolk. How do you catch your target without drawing too much attention to yourself? Simple, you get off the streets and instead climb walls, swing from scaffolds, and dance across rooftops. Unlike Prince of Persia, in which your wall-walking is limited to specific areas, in Assassin's Creed, if you can see it, you can climb it.





LET'S TAKE IT NUCLEAR

# World in Conflict

SEE  
REVIEW,  
PAGE 87!



Imagine that the Cold War never ended—instead it actually caught fire. That's the scenario facing you in *World in Conflict*. Russian tanks are rolling across Europe, and it's your job to stop them in their tracks.

Instead of utilizing the traditional two-phase combat system—build your base, then attack the bad guys—*World in Conflict* does away with the first part of the equation and has you jumping straight into blowing up Commies. Unlike most real-time strategy titles, *World in Conflict* includes some super-high-end graphical effects, including volumetric fog that swirls around your vehicles, destructible buildings and environments, and real-time lighting.

You won't want to play *World in Conflict* from a satellite-high perspective, lest you miss any of the game's glorious detail.





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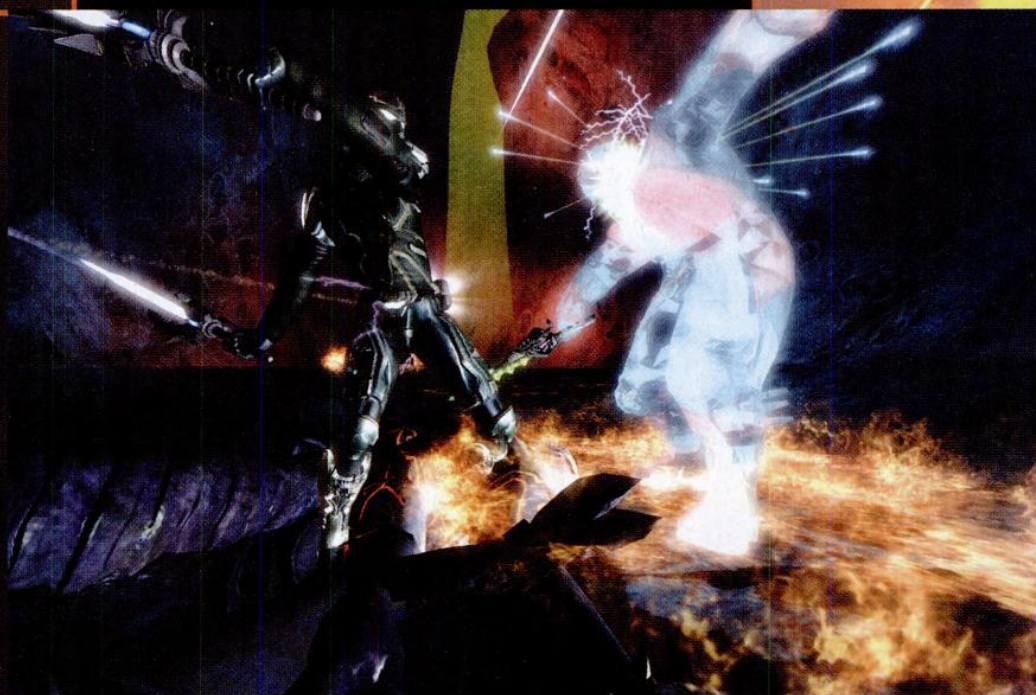
DEMONIC DESTRUCTION

## Hellgate: London

Flagship's first game is the spiritual successor and follow-up to Blizzard's seminal Diablo series. It's not Diablo III, but it's made by the same folks that made Diablo. Hellgate pits you against demons in near-future London, a setting that won't just challenge your skills, but also dazzle your eyes.

The game plays very differently depending on the faction you choose. The Cabalist and Templar fill the standard RPG ranged and melee archetypes. But when you play as a Hunter, you'll play the game from the first person perspective with traditional RPG elements—and utilize your twitch skills.

Naturally, Hellgate will turn on the eye candy too. We know that the game will support DirectX 10, but the graphical wizards at Flagship haven't announced what they'll be using it for, yet.



NOW WITH BAZOOKAS!

## Brothers in Arms: Hell's Highway



Welcome to Operation Market Garden, gentlemen. Our favorite tactical World War II shooter returns with a trip to Monty's folly powered by a spiffy new version of the Unreal Engine and a cargo plane full of new features.

Hell's Highway implements a much more realistic cover system. You duck behind an object, pop out to shoot, then duck back down before Jerry draws a bead on you. The only problem with this approach is that the game has a real materials engine, and much of the cover will get chewed up under a constant barrage of fire. Destructible cover sounds like fun, but it's a double-edged sword—you can tear up the Germans' cover, but they can do the same to you!



9 GAMES  
THAT WILL  
PUNISH  
YOUR PC

WE WERE TIRED OF KILLING NAZIS TOO

# Call of Duty 4: Modern Combat



Let's face it, by now most gamers have been fighting World War II longer than the war actually lasted. We've killed more virtual Nazis than ever existed. So Infinity Ward's decision to move beyond WWII is a welcome respite.

Call of Duty 4 is set in a hypothetical conflict in the former Soviet bloc. You can expect a heaping helping of small-squad action across a wide variety of terrain types—we've seen missions in burnt-out towns, grassy savannahs, and even forested hillsides.

The amazing thing is that Call of Duty 4 is a DirectX 9 game, eschewing support for DirectX 10's bells and whistles for higher frame rates and still-unbelievable graphics in the legacy API.







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# 9 GAMES THAT WILL PUNISH YOUR PC

## AUSTIN POWERS—THE GAME

### the agency

Sony Online's crazy concept MMO, *The Agency*, puts you in charge of a top-secret spy agency dedicated to protecting the world from standard-issue megalomaniacs. *The Agency* is impressive for more than its clever game design and highly stylized art direction.

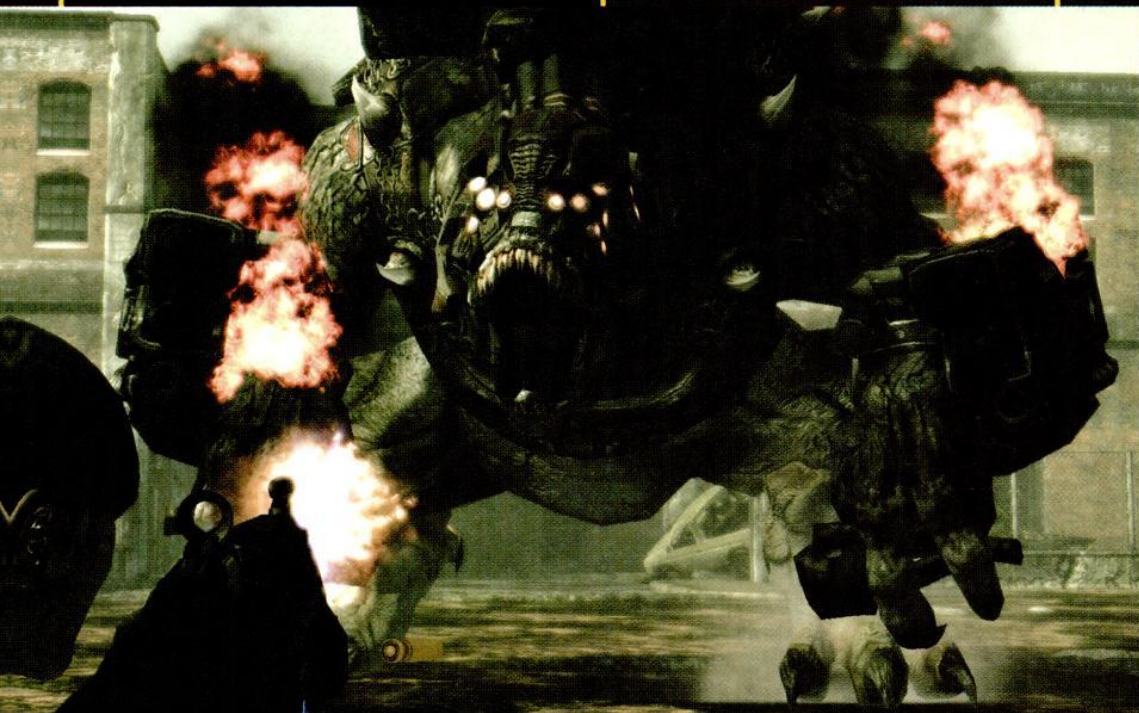
You see, the game progresses even when you're not logged in. If you set your science branch to design a new type of weapon, gadget, or car, the research will happen whether you're logged on or not. When the gizmo's ready for you to test, you'll get an email or text message with the good news.

The in-game combat is particularly interesting, with many varied missions. The one we saw was reminiscent of an old-fashioned dungeon crawl. First, you fight your way through the goons, then you rescue the person who needs rescuing, and then you track down the big boss.



## OVER-THE-TOP ACTION

### gears of war



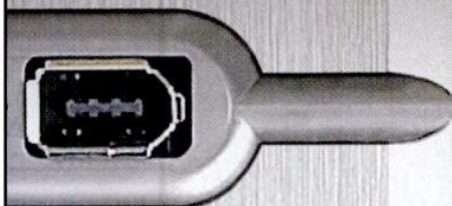
Something not so subtle happens to our pleasure centers when we lovingly apply chain saw to skull in order to finish off a deathmatch foe. *Gears of War* on the PC adds a whole new chapter to the single-player campaign and a handful of multiplayer maps to the Xbox 360 version.

In addition to new content, the team at Epic ratcheted up the texture resolution and removed some of the more annoying features (like depth-of-field blurring) for the PC version of *Gears*. But more than anything else, we're looking forward to the mission editor, which will let players create custom game types and play them with their pals using Games for Windows Live. That's something to get excited about.



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DEATHMATCH FURY

# Unreal Tournament III



Sometimes games look good, sometimes they look great, and sometimes they look like Unreal Tournament III—un-freakin'-believable. Mega-high-poly models and glorious displacement-mapped surfaces deliver a shiny fascia over the raw deathmatch action that we all know and love, in full Unreal Engine III glory.

UT3 showcases what Epic's third-gen Unreal Engine is capable of. It features an all-new renderer and supports high-dynamic range, per-pixel lighting; physics acceleration; and a whole lot more.

We can't wait to register our first M-M-MONSTER KILL!





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PHYSICS PHUN

# Crysis



There's not much more that we can say about Crysis that hasn't already been said. Crysis was the first DirectX 10 game we saw that truly rocked us, and while it won't be the first DirectX 10 game to ship, it will definitely set the standard for both graphical goodness and environment interaction.

The thing about Crysis is that it's not just another pretty face. The game's nanosuit lets you play however you want—use stealth, brute force, amazing aim, or a combination of all three. The weapons are customizable: You can add scopes, stabilizers, and silencers to the arsenal that's available.

We've played precious little of Crysis so far, but the time we've spent has convinced us that it's a worthy successor to Far Cry.

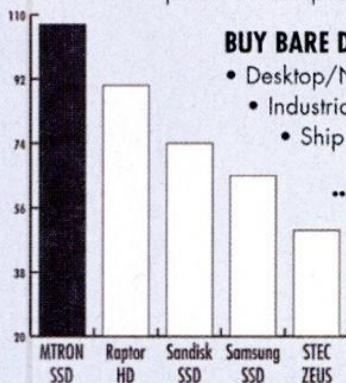


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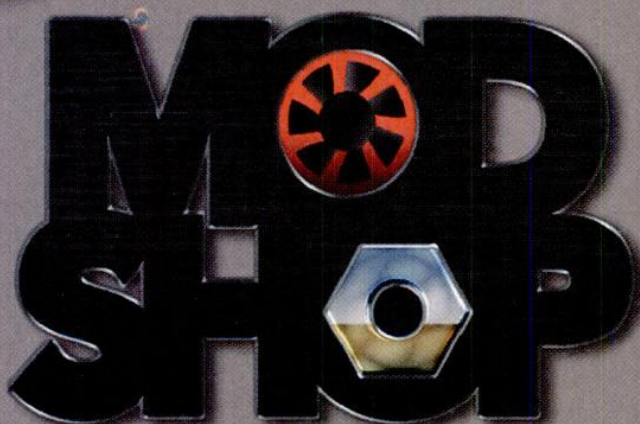
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## INTERVIEW!

# cevat yerli Dishes about Crysis

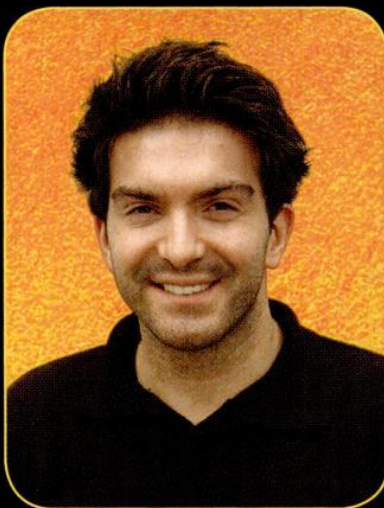
We sat down with Cevat Yerli, executive producer and director of Crysis to talk tech—specifically about the most beautiful game we've ever seen. Here's our exclusive chat with Yerli; we talk about DirectX 10, the problem with hardware physics, and shooting trees.

**Maximum PC:** Will there be obvious visual or performance differences for people running Crysis in DirectX 10 mode vs. DirectX 9 mode? Can you describe some of the differences people who've upgraded to Vista and DirectX 10 can expect to enjoy?

**Yerli:** The DirectX 9 version of Crysis will be the one for the bulk of current-generation PC gamers. It will feature the maximum fidelity you can achieve with DirectX 9 standards, alongside high dynamic range rendering, advanced skin and vegetation shaders, soft shadows, and more. In DirectX 10, however, you will experience a quality of Crysis that is deeper in lights and shadows and atmospherics and has a full-motion gameplay experience.

**MPC:** CryENGINE2 in general, and Crysis in particular, obviously utilizes physics-based gameplay. It's equally obvious that physics requires lots of processing horsepower. Where will the engine and the game look to get those processor cycles? What will be the best solution for gamers: A multicore CPU, a multiple-GPU rig with graphics running on one GPU and physics running on the other, or a dedicated physics processor?

**Yerli:** We are not supporting GPU or dedicated physics processors for a variety of reasons. The main one is that we did not want to change the core gameplay physics for our min-spec configurations. We have been optimizing our dynamics code for many years now, so it can run robust and as optimally as it can on CPUs of previous generations while also taking advantage of newer multicore architec-



tures. So you are best equipped with a quad core (if you have the budget), but Crysis will do great on dual-core configurations as well.

**MPC:** As the game nears its release date, has the development team found it necessary to scale back any features in order to obtain reasonable performance on midrange hardware, with midrange being defined as an Intel Core Duo E6600 CPU (or AMD equivalent), 2GB of memory, and either a Radeon HD 2900 XT with 512MB of memory or a GeForce 8800 GTS with 640MB of memory.

**Yerli:** If that's midrange for you, then not at all! This spec is well within our plans. Most important to us is that we scale Crysis from a three-year-old configuration (by release date) to a current and next-gen configuration and take maximum performance from the available hardware. Our benchmark has been to compete for various generations of hardware alongside the generations of games shipped around them. For example, our min spec is competing with Far Cry, and that's over three-and-a-half years old.

**MPC:** Will Crysis be made available on Steam or another digital distribution source? Or will it follow the more traditional model of boxed-copy sales only?

**Yerli:** We are going to be available for digital distribution through the EA Link Service. We see only benefits in this model; it's our goal to serve the customer, and giving them choices is a great way to do that.

**MPC:** How many execution cores will the game support? What will you use the different cores for?

**Yerli:** Our multicore implementations encompass physics, AI, game logic, and particles and are balanced over two or four cores to take next-generational advantage. Of course, we also run on single-core highly optimized.

**MPC:** How will gameplay be affected by multicore? Will there be any noticeable differences for people with multicore systems, or just better performance?

**Yerli:** Nope, smoother and higher frame rates in simulation is the key here for us.

**MPC:** Will players be able to play Crysis in DirectX 10 mode on high-end hardware at high resolutions (1600x1200 or higher) using current-gen hardware (GeForce 8800 GTS and up, or Radeon 2900 series boards)?

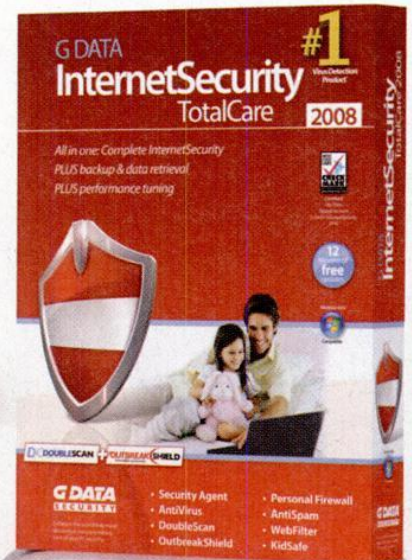
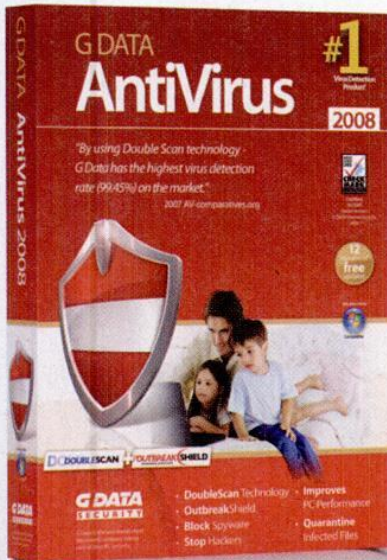
**Yerli:** I believe in maximum settings you will run at 1280 resolutions, but to run even higher you need a better configuration. However, that is because we feature out-of-the-box future-proof technology and settings that will keep Crysis state-of-the-art looking even for the next next-generation hardware, allowing the PC gamer to take advantage of evolution!

**MPC:** Have you ever actually tried to shoot down a real tree? It's much harder than you guys make it look in the game!

**Yerli:** Hee hee, did you ever run into a camp and fight alone for survival? It's much harder in real life. :) Getting your point though! :) **MPC:**



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Windows Vista



Compatible





# Seeing is Believing

Although early adopters of DirectX 10-compatible hardware (read: Nvidia's GeForce 8 series) got a humungous framerate boost from their new hardware, it took months for games that actually use DX10 effects to trickle onto shelves—and the first few did little to impress.

Well, more—and better—games are here at last, and while the pace may still be more of a trickle than a flood, plenty more are on the way. With *Company of Heroes: Opposing Fronts*, *Hellgate: London*, *Flight Simulator X: Acceleration*, *Lost Planet: Extreme Condition*, *BioShock*, and *World in Conflict* already on shelves (not to mention our time with early builds of *Crysis*),

there are finally enough games to fairly evaluate whether or not DX10 is living up to the enormous hype shoveled at us throughout the past two years by hardware manufacturers, game developers, and Microsoft itself.

Up until now we've been screaming "no!" However, the recent flood of quality games is warming us up. Going forward, just about every new game that hits your hard drive will have some sort of DX10 embellishments. So it's finally time to start thinking seriously about taking the upgrade plunge to Vista, and a new high-end DX10 videocard, sooner rather than later.

Right now, it's tempting to compare DX10 to something



"WE'VE BEEN ABLE TO INTRODUCE A NUMBER OF DX10 FEATURES TO *BIOSHOCK*, INCLUDING BETTER LOOKING FIRE, HIGHER RESOLUTION SHADOWS AND MAKING ALL THE WATER IN THE GAME FULLY REACTIVE TO THE PLAYER." —MARTIN SLATER, LEAD PROGRAMMER, 2K BOSTON



**1. [SMOKE PLUMES]** DX10 allows developers to create thick, volumetric, and righteous smoke that reacts to objects that pass through it.

**2. [AREAS OF FOLIAGE AT BOTTOM CENTER, MIDDLE CENTER-LEFT, AND EXTREME LEFT]** "Instancing" allows developers to create a variety of objects from a single core model, which helps devs avoid the monotonous, cookie-cutter look of greenery in DirectX 9 games.

**3. [FIRE IN CENTER, BEHIND BUILDING]** Fire can be rendered much faster and with far more realism under DX10 than that orange-y DX9 stuff.

**4. [TINY BITS OF SHRAPNEL IN THE CENTRAL SMOKE PLUME—LOOK CLOSELY, THEY'RE IN THE CENTER OF THE PLUME—AND IN THE PLUME IN THE BACKGROUND TO THE CENTER-RIGHT]** Shrapnel created with DirectX 10's "soft particles" effects blends in seamlessly, popping out as a result of the hard edges of particles under DirectX 9.

**5. [FIRE AT MIDDLE LEFT, BEHIND BUILDING CLUSTER]** More fires? Looks like you're losing bud—too bad DX10 can't play your game for you.

## After a long and trying wait, DX10 is finally starting to deliver the goods

delicious, like butter. You just spread it on something—bread, shoes, paperback books, *anything*—and it tastes better. But that wouldn't be an apt description. Just because a game uses DX10 doesn't mean that it's guaranteed to look fantastic. But the odds are definitely better.

A better way to look at DX10 is to compare it to a sophisticated and well-stocked toolbox, and how well a developer wields the tools it has to offer affects what comes out in the game. And the way developers are using the tools today, we're seeing big payoffs in three areas in particular: lighting, reactivity, and object diversity.

### THERE WAS LIGHT, AND IT WAS GOOD

Even the best-looking traditional lighting effects tend to lose their realism as you get closer to their source: light tends to have a sharp edge; it doesn't diffuse correctly or have the ambience it ought to. But a DX10 lighting effect will feature light descending in shafts through clouds—called "God rays" by game developers and film directors—that have volume; you can walk through one and be engulfed in its glow, which is how light behaves in the real world.



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"God rays," courtesy of DX10, in *World of Conflict*.

### SMOKING ENCOURAGED

Similarly, smoke and fire are familiar elements in game worlds, but like the primitive lighting effects we mentioned above, they've been flat and unconvincing affairs that we accept only because we're used to them: that's how they've *always* looked in games. Not anymore. With DirectX 10, developers can now create smoke with volume and even resistance, so that smoke trails in the wake of a bat that flies through its plume, just as smoke would react to a bat flying through its plume in real life, if you could convince one to fly through smoke.

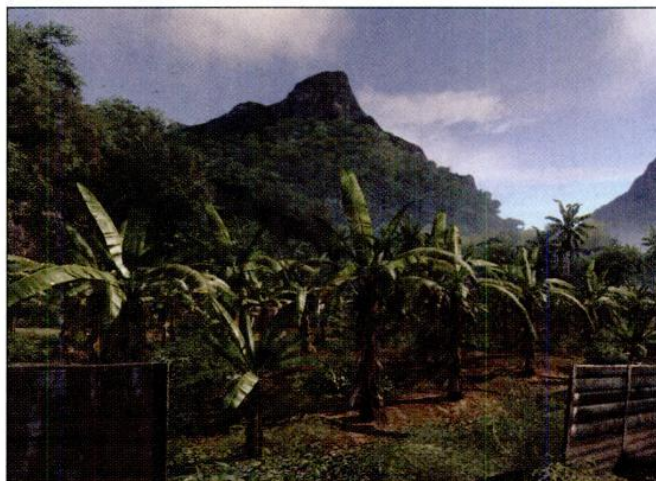
**"AFTER PLAYING *COMPANY OF HEROES* [UNDER] DX10 DURING A NIGHT MISSION YOU'LL NEVER WANT TO PLAY UNDER DX9 AGAIN!"**  
—REMY SAVILLE, SUPERVISING GRAPHICS PROGRAMMER, RELIC

### LAND OF PLENTY

While visual standards rose overall in PC games (frequently approaching photorealism), leafy foliage—trees, grass, shrubs, fallen leaves—continued to look ridiculous. Even those awful cellular towers designed to look like trees look better than most in-game flora. The problem is that while it's easy to model a leaf, a branch, or even a tree in three dimensions, depicting a moor filled with swaying grasses or a rainforest canopy would require years of work from development teams and result in so many polygons onscreen at once that you'd end up watching a filmstrip instead of playing a game. DX10 makes instancing—creating a variety of objects based



Smoke effects are rendered much more realistically in *Company of Heroes: Opposing Fronts*—if you're running DX10.



The foliage in *Crysis* is rendered in much more detail with DX10.

on a single example—a snap. This technique isn't limited to twigs, either—developers can use instancing to create a small army of NPCs that vary in height, shape, and color, just like the real NPCs in our lives.

There's plenty more to explore in the DX10 toolbox, including some amazing gadgets for creating realistic fur and hair, cloth simulation, and built-in high dynamic range (HDR) rendering, but

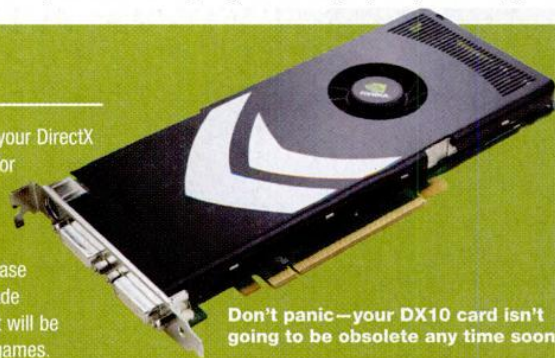
## DirectX 10.1—Coming Soon to a GPU Near You

You heard right: Even though developers have barely begun to plunder the capabilities of DirectX 10, plans for DirectX 10.1 are already in the can. This incremental update is currently scheduled to be released with Windows Vista Service Pack 1 in January 2008 (you'll be required to install the Service Pack in order to get it), and raises image quality standards for DX10 hardware by adding support for Shader Model 4.1 and mandating, among other things, 32-bit floating point filtering and 4X anti-aliasing samples. These standards, mind you, are for hardware manufacturers only, so don't worry—Microsoft isn't trying to force *you* to run games with 4X anti-aliasing enabled.

I know what you're thinking, and you can

relax—DirectX 10.1 will not make your DirectX 10-compliant videocard obsolete. For the foreseeable future, games that support DirectX 10.1 will also support DX10 in order to take advantage of the vast install base of DX10 cards, and once you upgrade to a DX10.1-compliant videocard, it will be backwards compatible with DX10 games.

If you're wondering why Microsoft is shoving an update out of the stables so quickly after the introduction of DX10, well, the truth is that the interval between the two versions isn't really any longer than the interval between, for example, DirectX 8 and DirectX 8.1, which was about a year.



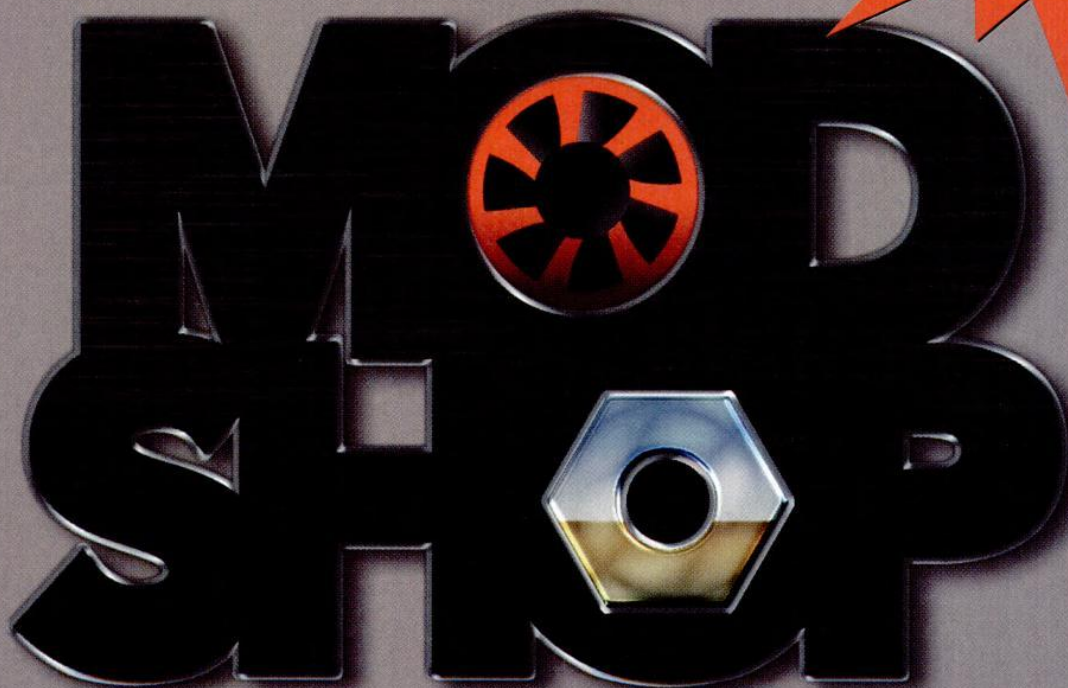
Don't panic—your DX10 card isn't going to be obsolete any time soon.

And if the company's recent history is anything to go by—witness the four years between DX 9 and DX 9.0c and all the awesome things developers managed to do with it throughout that time—it ought to be several years after the release of DirectX 10.1 before another major version.



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by now, you get the idea. DX10 is pushing the envelope of visual realism in games. Flat lighting, unconvincing smoke, and foliage that looks like it's been cut out of construction paper will soon go the way of the sprite once developers sign up and begin implementing everything that's available to them in DX10.

And many of them already have. Let's take another look at DX10 effects in today's games, but this time, compared to the same scenes rendered with DirectX 9. If you haven't been convinced yet, take it from us—you will be.



Under DirectX 9, the textures in this campfire scene from *Age of Conan: Hyborian Adventures* are flat: the groundcover looks like mush, and the foliage looks more like a strange fungus. Under DirectX 10, the foliage is lush, the textures pop, and the scene looks much more realistic. But the kicker is the atmospheric foliage at the top right. That's the kind of world DX10 can build.

"[DIRECTX 10] MAKES POSSIBLE MANY EFFECTS THAT ARE TOO SLOW OR TOO COMPLEX FOR DX9. FOR EXAMPLE, [HELLGATE: LONDON] HAS SOFT PARTICLES, MOTION BLUR, DEPTH-OF-FIELD, AND EVEN REAL FLUID DYNAMICS—SIMULATED SMOKE AND STEAM—ALL RUNNING AT THE SAME TIME!"

—CHRIS LAMBERT, LEAD GRAPHICS ENGINEER,  
FLAGSHIP STUDIOS (HELLGATE: LONDON)



What kind of next-generation effects you'll see in DX10 games depends, naturally, on what kind of tools the developers help themselves to. *Lost Planet: Extreme Condition*, for example, looks sharp and detailed under DirectX 9, but becomes much more realistic, intense, and dynamic by adding a coat of fur to the creature along with motion blur as it whips back and forth, soaking everyone and ruining suede coats.

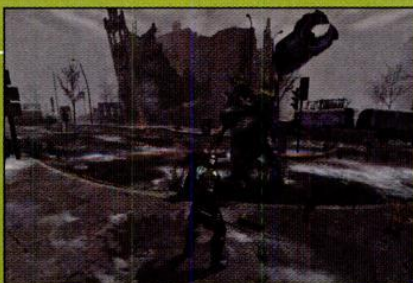


If you had to bet on the most impressive, drop your jaw effects that DX10 is capable of, put your money on water effects. Although even the DirectX 9 water effects—shown here from *Crysis*—are impressive, the DX10 water goes overboard (get it?) with much more realistic whitecaps, refracted light, and surface reflections.

## Poetry in Motion Blur

One of the biggest contributions to visual realism that DX10 has to offer is velocity-mapped motion blur. Go ahead and yawn—very funny—but once you see it in action, once you play for a while with DX10 motion blur enabled, you'll be sold.

Try this experiment: Stick your thumb up in front of you at arm's length, as if you were hitchhiking, and focus on it. Now whip your thumb from side to side, following it with your head and keeping it in focus. Notice how the world behind your thumb blurs as you track your little opposable friend. That doesn't usually happen in games; the picture stays sharp all around you no matter how fast you are moving.



In this DX10 screenshot from *Hellgate: London* the monster's speed and strength is visually communicated to the player with motion blur, just before the player gets squished.

Motion blur existed before DX10—*Crysis* features motion blur under DirectX 9—but it's essentially faked by smudging the image (with a small framerate penalty). DX10, on the other hand, allows developers to map blur to



the speed and direction of a character's or object's movement. It's a subtle effect, but once you become accustomed to it, games without motion blur look unrealistic and just plain wrong. MPC





DEMOS

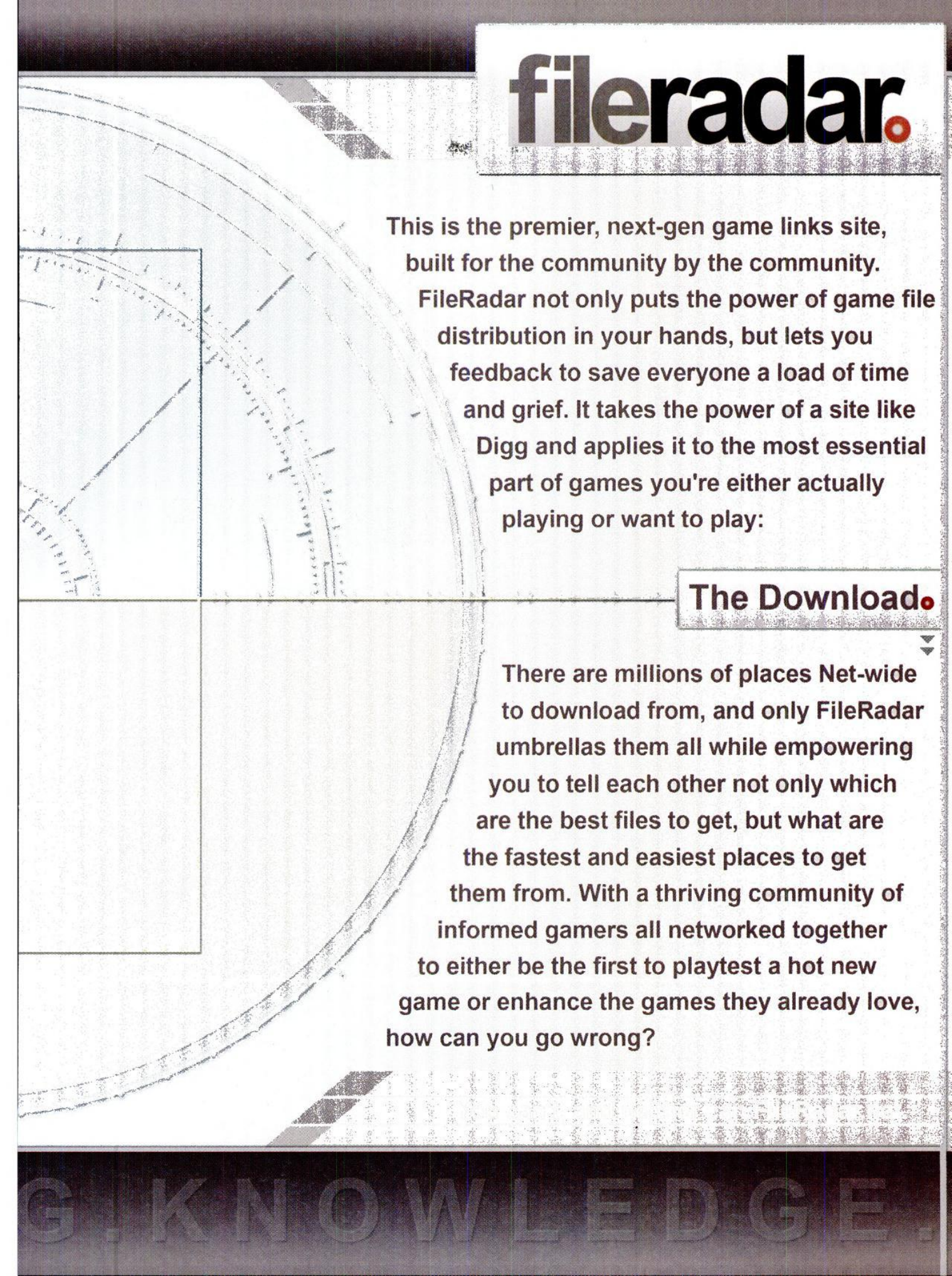


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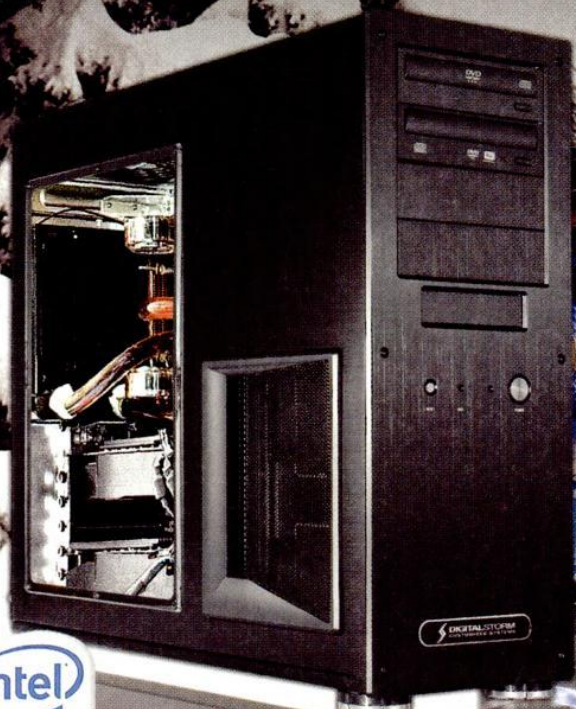


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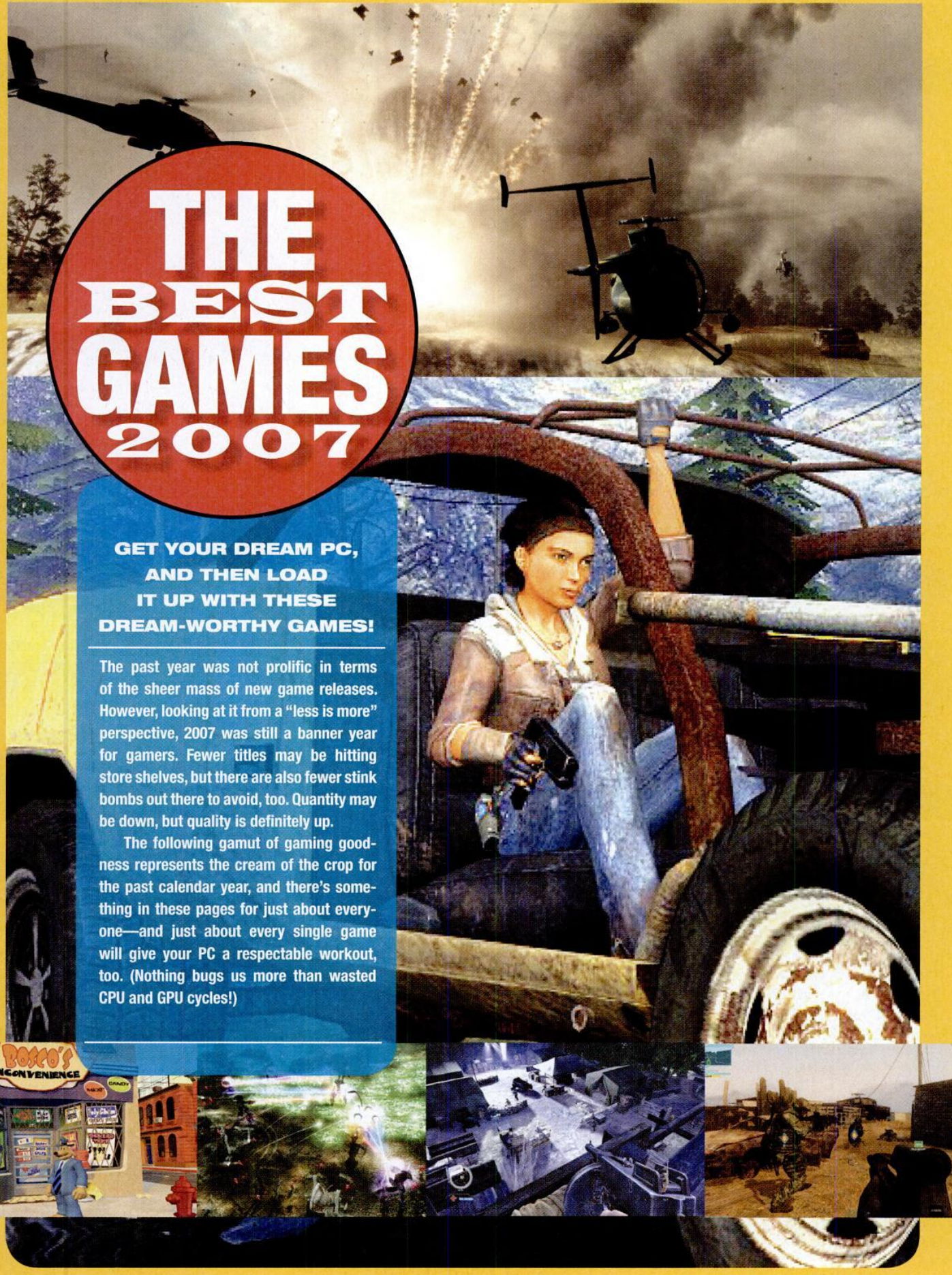
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# THE BEST GAMES 2007

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The past year was not prolific in terms of the sheer mass of new game releases. However, looking at it from a "less is more" perspective, 2007 was still a banner year for gamers. Fewer titles may be hitting store shelves, but there are also fewer stink bombs out there to avoid, too. Quantity may be down, but quality is definitely up.

The following gamut of gaming goodness represents the cream of the crop for the past calendar year, and there's something in these pages for just about everyone—and just about every single game will give your PC a respectable workout, too. (Nothing bugs us more than wasted CPU and GPU cycles!)



## The Orange Box

With tons of Half-Life goodness, Team Fortress 2, and Portal, this is the best deal in gaming history

Finishing The Orange Box left us in a state of shock. It wasn't Half-Life 2: Episode 2's requisite cliffhanger ending that floored us; rather, it was the realization that Episode 2 is the *low point* of the entire Orange Box package. Portal and Team Fortress 2 completely eclipse what Valve bills as the "centerpiece" of the bundle.

Don't get us wrong, Episode 2 is not a bad game. It's more of the same Half-Life 2 goodness, chock-full of physics puzzles and zombie killing; Valve even does out a few more tidbits of the story of humanity's battle against the Combine.

That said, Episode 2's biggest failing is that it's more of the same: the same types of puzzles, the same enemies, and the same environments. The game remains extremely linear, with a well-defined path littered with choke points and the occasional set-piece battle.

Portal lies at the opposite end of the innovation spectrum. This game delighted us with its innovative gameplay and twisted sense of humor. The concept is simple: You have a gun that lets you rip holes in the space-time continuum, which you can then move materials (or yourself) through. More puzzle game than first-person shooter,

Portal's genius lies in the way it introduces new concepts and gameplay mechanics to the player, then immediately forces you to utilize those

**Team Fortress 2 is our favorite part of The Orange Box, and we dig it for more than its stunning character designs!**

mechanics in combination with everything you've learned before. Although it's short, Portal delivers nonstop fun from the opening sequence to the end credits.

And then there's Team Fortress 2. The first thing you'll notice about TF2 is its unique *Incredibles*-esque art style and character design. The second thing you'll notice is that it *is* Team Fortress. Not a reimagining. Not a modernized class-based shooter. It's Team Fortress Classic, perfectly balanced, with all the rough edges smoothed off, and it is, without a doubt, the best multiplayer shooter we've played this year (sorry, Quake Wars).

What really surprised us about TF2 is that Valve included only six maps. While we were initially torqued by this paltry number, the collection is rich and hearty. Because the community for this type of game usually ends up playing on only a handful of maps—we call this the Karkand Effect—Valve concentrated on building six arenas that truly kick ass.



**Don't let the small screenshot fool you—Portal is one of the best single-player games of the year.**

With Team Fortress 2, Portal, Episode 1, Episode 2, and Half-Life 2, this is the can't-miss gaming package of the year.

—WILL SMITH

### THE ORANGE BOX

• \$50, [www.steampowered.com](http://www.steampowered.com), ESRB: M

**9**  
MAXIMUM PC  
KICKASS

## BioShock

Believe the hype, this undersea action-adventure is the best game so far this year!

No game we've played in the last 20 years has evoked such powerful emotions as BioShock.

No other game has made us feel this level of compassion for a character. And no other games presented us with as many painful choices. Even when a game presented an ethical dilemma, the choices were usually black and white—not so here.

BioShock does tell a generic story: Kill the bad guy, escape from the dystopia. However, the story is rife with subtext—objectivist philosophy is obviously the underpinning for Rapture, the game's underwater setting, but the game is also injected with parables illustrating the dangers of hubris and science unchecked by a code of ethics.

The choices in BioShock are terrifying—do you kill a little girl to get a material reward or do you let her live and settle for a lesser reward? To

make the choice more difficult, you're presented with conflicting advice from conflicting archetypes.

Of course, if you didn't feel empathy for the characters, killing the little girls would be an easy decision. But, by introducing you to the victims' families via audio diaries and in-game events, as well as a constant stream of one-way audio communications from every living character in the game, BioShock left us with a deeper feeling of investment in its characters—from Andrew Ryan to the character you play, to the bit players who show up for mere moments—than any game we've played in the last decade.

Completing BioShock isn't about the ending—the final battle and three endings are the



**Big Daddies provide the game's most challenging battles, requiring you to use your plasmids and ammo wisely.**

weakest parts of the game—but about the journey along the way.

—WILL SMITH

### BIOSHOCK

• \$50, [www.2kgames.com/bio-shock](http://www.2kgames.com/bio-shock) ESRB: M

**10**  
MAXIMUM PC  
KICKASS



## Medal of Honor: Airborne

It's raining soldiers

Dear Mom and Dad,

The moment I jumped out of a C-47 for the first time over Italy with the 82 Airborne I was engaged in one of the most intense adventures of my life.

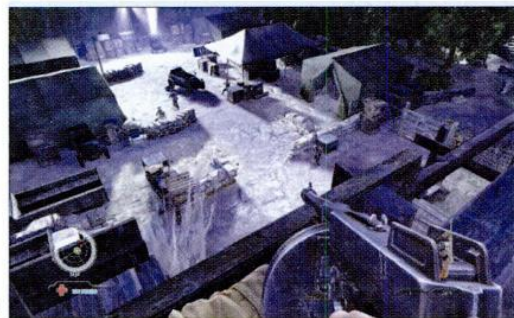
After meeting up with some fellow paratroopers, we stormed the mayor's residence from the rear to seize control of the building and demolish some anti-aircraft guns. I then led the way to other objectives, facing stiff resistance from Razzi soldiers along the way. Even though I chose this sequence of attack, I had the freedom to carry out my directives in any order. It's also reassuring to know that if I am ever taken out of commission in battle, another eager soldier will be ready to parachute down and take my place to continue the fight.

Some of the more difficult skirmishes came in later missions, such as Operation Neptune. By then, we had moved up through Italy to France, where we supported the invasion of Normandy

with an inland assault. The Nazis we faced were smarter here, working together to flank our sides and falling back to new cover positions whenever we pushed too close.

I also want to let you know that the military has recognized our efforts, rewarding us with a steady flow of weapon upgrades. My trusty Thompson submachine gun is now outfitted with three improvements, decreased recoil, a larger magazine drum, and a pistol grip for increased accuracy. Earning these improvements through proficient use of my weapons felt gratifying, and the extra boost definitely helped when I was sent to assault a monstrous flak tower. We lost a lot of men in this brutal mission, many of whom died at the hands of the MG42-wielding Nazi elites.

But now that my tour of duty is complete, I feel



**Getting the drop on enemies isn't always easy. Troops evaluate their situation and fall back to new positions if necessary.**

I could've done more. My six missions were challenging, but they flew by.

Your loving son,  
Boyd Travers

—NORMAN CHAN

MEDAL OF HONOR: AIRBORNE

• \$50, [www.ea.com/moh](http://www.ea.com/moh), ESRB: T

9

MAXIMUM PC  
KICKASS

## Enemy Territory: Quake Wars

That tremor you feel is the revival of a franchise



**The fast-paced close-quarters combat is reminiscent of classic Quake deathmatch.**

When we think of Quake games, we think of fast-paced deathmatches in their purest no-nonsense form. In *Enemy Territory: Quake Wars*, the latest iteration of the shooter franchise, that visceral run-and-gun experience still makes up the foundation of gameplay, but the integration of deep teamplay tactics and mission objectives makes this a whole new multiplayer animal. The meld of cooperative squadplay and frenzied firefighting makes for compelling matches, but both deathmatch and tactical purists may find themselves in slightly unfamiliar territory.

We fought for possession of Earth across 12 battlegrounds as both GDF and Strogg forces, each round structured in an assault and defend format. Up to 32 players fill the battlefield, contributing to the fight in one of five roles: Nothing special here—you choose between the typical assault, medic, engineer, field

ops, and covert ops classes.

Helpful tooltips give each player sub-missions and goals unique to their classes, leading Aggressors to plant explosive charges at vault doors and Infiltrators to hack computer systems. *Quake Wars*'s map objectives are some of the most diverse we've seen in a multiplayer game.

We weren't impressed with the graphics of the "Megatextured" game, which suffered from overused browns and last-gen lighting. But once we got past the superficial deficiencies, we were in for a fresh multiplayer experience worthy of the Quake name.

—NORMAN CHAN

QUAKE WARS

• \$50, [www.quakewars.com](http://www.quakewars.com), ESRB: T

8

## World in Conflict

Proof that mutually assured destruction is not a viable nuclear deterrent



**Zoomed in, *World in Conflict* looks better than some first-person shooters.**

Nothing flexes our imagination like alternate history scenarios, and *World in Conflict* delivers one that has us on the edge of our seat. It's the late 1980s, and the Cold War is far from over. The commies have already made a push to invade Western Europe, and in a desperate move, have decided to mount a sneak attack on American shores. It's your mission to contain the Soviet invasion and retake Seattle before the invaders paint the country red.

WiC isn't just the prettiest strategy game we've ever played—the effects are stunning—it's also one of the most tactical. In each mission, you're charged with capturing a series of control points with a limited number of units. The game eschews base building and unit construc-

tion by giving you a set number of points to call in vehicle and infantry airdrops.

The suburbs of Washington state and the bleak wilderness of Eastern Europe are just a few of the amazingly detailed battlegrounds ready to be demolished in the game. In-game cut scenes help flesh out the narrative by giving glimpses into the lives of the soldiers fighting under your command. The war at home feels very real; its impact resonates even more when nukes are detonated on American soil.

—NORMAN CHAN

WORLD IN CONFLICT

• \$50, [www.worldinconflict.com](http://www.worldinconflict.com), ESRB: T

9

MAXIMUM PC  
KICKASS



## Command & Conquer 3: Tiberium Wars

What if Jerry Bruckheimer designed a strategy game?

Tiberium Wars picks up on the long-running conflict between Global Defense Initiative (GDI) and Brotherhood of Nod forces on a Tiberium-infested Earth. Over the course of three-dozen missions, you side with each of the game's three factions, waging war to protect the citizens of Earth, spreading the word of the prophetic Kane, and freaking everyone out with an alien invasion. *Independence Day*, eat your heart out.

High-quality cinematic cutscenes (in HD resolution) and plenty of in-game scripted narratives and informational videos kept us absorbed in the plot and made mission objectives more

compelling. The B-list actors give adequate performances, but it's Joe Kucan's reprisal of his role as Kane that sells the show. His over-the-top performance sets the perfect tone for the action and TNT-powered gameplay.

RTS veterans will feel the missions are a bit dumbed down, but the game's excellent map design, brilliant environment models, and snazzy visual effects sufficiently amp up the gameplay. We love the way the tumultuous future is rendered—crumbling cityscapes from every part of the world are meticulously detailed with dilapidated buildings and abandoned superhighways.

We fully enjoyed the explosive



A tank with two barrels? That's impossible!

action of Tiberium War's single-player campaign—the game has a Hollywood blockbuster look and feel. Unfortunately, the visual flair comes at the cost of tactical depth and innovations in strategy. Tiberium War is the best Command & Conquer

game to date, but it can't hold its own against the hardcore likes of *Supreme Commander* and *Company of Heroes*.

—NORMAN CHAN

COMMAND & CONQUER 3

8

• \$50, [www.commandandconquer.com](http://www.commandandconquer.com) ESRB: T

## Splinter Cell: Double Agent

Keeping two masters happy is never simple, especially if you're a super-spy



*Double Agent* presents you with a series of difficult decisions: Do you let an innocent man live or do you kill him to gain the terrorists' trust and save millions more lives?

In *Double Agent*, the series' fourth installment, you go deep undercover, infiltrating a terrorist organization. In order to maintain the trust of both your NSA employers and the terrorist leaders, you'll need to complete objectives for both organizations. Naturally, it's not simple. Frequently the NSA's instructions and the terrorists' objectives are mutually exclusive—one side might want someone killed, while the other wants him to live. You'll have to find ways to keep both masters happy, or deal with the consequences.

The scenarios you're presented with are by no means cut and dried; the game puts you in situations ripped from the best episodes of 24. The HQ missions are a big

advancement. These missions take place in the terrorist HQ, and again you're given two sets of tasks, which you can complete in any order. The catch is that you're on the clock. If you don't complete all the assigned tasks in the prescribed length of time, the terrorists won't be happy with you.

While the single-player campaign is great fun, we're pretty pissed about the stripped-down multiplayer. Ubisoft did include a series of cooperative spy-vs.-AI merc missions, but the merc AI seems impossible to escape when you're spotted.

—WILL SMITH

SPLINTER CELL:  
DOUBLE AGENT

• \$50, [www.splintercell.com](http://www.splintercell.com)  
ESRB: X

8

## Supreme Commander

This most definitely ain't your father's RTS!



The Armored Command Unit is your on-field general; Lose it and it's game over.

*Supreme Commander* may not be called *Total Annihilation II*, but it is very much the spiritual successor to that genre-redefining game. And, as with TA, our expectations for an RTS are forever changed after playing Supcom.

This is quite simply the biggest, most explosive, most visually gratifying RTS we've ever played. Everything about this game screams B-I-G, from the size of its units and maps to the size of its explosions—and system requirements.

The game serves up three single-player campaigns featuring three very visually distinct factions—all vying for control of the galaxy. The story is well told and backed by top-notch production values. Each campaign may include only six missions, but each mission grows in size as

various objectives are met, and most missions take several hours to complete. (And you get deep skirmish and multiplayer options, too.)

Supcom's maps are simply ginormous—think hundreds of square miles, not a couple of football fields! You can have up to 500 units in your army at once, as can each enemy commander on the map, and up to eight players can go at it on multiplayer maps. The math adds up to mass carnage, and it also makes for a game that feels much more like real war than anything we've played yet.

—STEVE KLETT

SUPREME COMMANDER

• \$50, [www.supremecommander.com](http://www.supremecommander.com), ESRB: E 10+

10

MAXIMUM PC  
KICKASS



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## Lost Planet

Explosive action in a winter wonderland

If you've ever had that dream where all the awesome things you love are in one place, but everything is a little hazy and it all ends too soon when you wake up, you'll have a good idea what playing *Lost Planet* is like. This ported Xbox 360 game is packed to the brim with enough giant insects, killer worms, armored mechs, and glorious explosions to enthrall any science-fiction geek. Its only major shortcoming is that all of this awesomeness is crammed into a package that's all too brief—we completed the fantastic single-player campaign in just over six hours.

The setting for this third-person bug-smashing romp is E.D.N. III, an ice-covered planet that

foolish humans tried to colonize once upon a time. After their first attempt to conquer both the icy elements and native inhabitants (the bugs) failed miserably, the original colonists eventually resorted to piracy to survive. Yes, they're snow-faring pirates—this game is that cool. As Wayne, you not only pump rifle rounds into hundreds of roaring bugs and pesky pirates but also fend off attacks from the evil NEVEC corporation, which is hell-bent on terraforming the planet in another attempt to make it inhabitable.

While unraveling the conspiracy behind NEVEC's operation, we blew our way through 10 missions that traversed snow-covered mountains, snow-covered caves, and abandoned snow-covered ghost towns. Though the frosty theme blanketed most



If you're without a mech and battling a monstrous insect, be sure to duck, cover, and roll before you're impaled.

of the environments, the variety of opponents, weapons, and mechs mixed up the fights sufficiently to keep us entertained.

Unfortunately, players rushing to reach the end of a level can simply sprint through most of the action, bypassing firefights and confrontations while conserving thermal energy. In fact, once we realized this trick, most shoot-outs felt more like irritating obstacles than intense

challenges of firearm prowess.

Luckily, reaching the end of a level is its own reward, as epic boss battles are the best part of the game.

—NORMAN CHAN

LOST PLANET

• \$40, [www.lostplanet-the-game.com](http://www.lostplanet-the-game.com)  
ESRB: T

8

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## Rainbow Six: Vegas

Counterterrorists crack down in the land of \$7.99 prime rib dinners



Terrorists drop in from all sides, so find some cover!

With a revamped squad system and well-designed environments, *Rainbow Six: Vegas* takes the tactical combat franchise to a new level of intense action.

Your adventures in counterterrorism begin in a Mexican border town, where you're in hot pursuit of weapons smuggler Irena Morales. There, you learn the ropes of the new dynamic team-control scheme. The *Rainbow* assault team is now composed of a single squad of three members—down from four—which you direct on the fly with context-sensitive commands.

Pointing and clicking sets the squad up to breach a room, rappel down a shaft, or find cover. This

simplified system replaces the pre-planning stage, which means you'll have to make decisions in the heat of battle.

We were treated to blisteringly beautiful levels that included hostage-rescue and bomb-defusing scenarios inside three intricately designed casinos and gauntlet-style assaults on the Vegas Strip.

The game does take some liberties with realism: Your buddies have unlimited ammo and grenades, and while you're not bulletproof, you can recover from hits just by finding cover and waiting out the damage.

—NORMAN CHAN

RAINBOW SIX: VEGAS

• \$50, [www.rainbowsixgame.com](http://www.rainbowsixgame.com),  
ESRB: M

8

## S.T.A.L.K.E.R.: Shadow of Chernobyl

If the radiation and mutants don't get you, the bugs eventually will



Gas masks won't save you from radiation poisoning—or a barrage of bullets.

Numerous bugs and stability issues plague this ambitious shooter, but its thrilling action and deep story are surprisingly fun—it's enough to win us over.

S.T.A.L.K.E.R.'s narrative is propelled by a single string of core missions and assignments, but you can complete them at your own pace. The game does an admirable job of feigning open-endedness by offering a ton of side missions. It may not be a full-fledged role-playing experience, but it was definitely meaty enough to satisfy us.

It took us almost 15 hours to reach S.T.A.L.K.E.R.'s explosive climax. The shooting mechanics are geared toward realism, so the

combination of patience and steady aim is the only way to get really effective head shots. Firefights felt as though they lasted forever, as we had to constantly move to avoid flanks and slowly drain down enemy forces one body at a time.

Unfortunately, the game isn't without its faults. Numerous bugs plague the missions, sometimes objectives won't complete, and often the game will just crash to the desktop. Thankfully patches that address many of these issues are now available.

—NORMAN CHAN

S.T.A.L.K.E.R.:  
SHADOW OF CHERNOBYL

• \$40, [www.stalker-game.com](http://www.stalker-game.com),  
ESRB: M

8



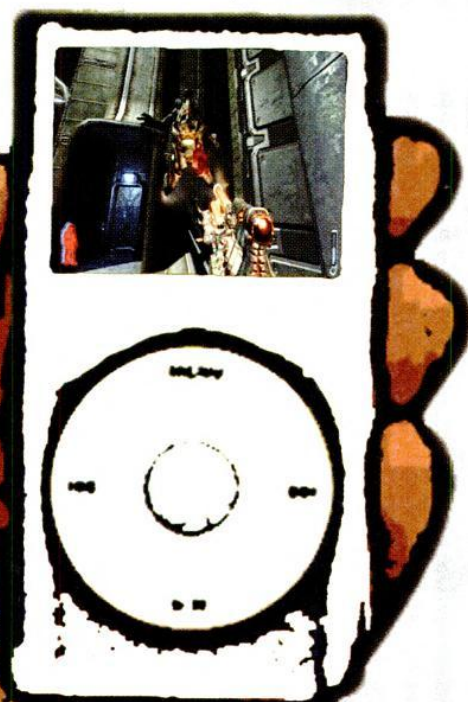
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## Ghost Recon Advanced Warfighter 2

Now with even more advanced war-fighting technology



It's always a good idea to send teammates to scout around corners to avoid being sniped in the head.

Ghost Recon Advanced Warfighter 2 impresses with both its improved AI pathfinding and new tactically sound team controls.

You again fill the boots of Scott Mitchell, who has been sent to Mexico to support loyalist troops defending against a violent rebellion. Your tasks of keeping the peace, rescuing captured pilots, and recovering stolen nuclear weapons are eased by the support of your Ghost squad, which exhibits deft tactical skill. The improved team intelligence is a welcome

necessity, as we found enemy soldiers to be proficient sharpshooters. GRAW 2 definitely rewards the patient planner over the fighter with an itchy trigger finger.

The action is fast, furious and fun but it's all over a bit too soon. The game's 10 campaign missions don't add up to more than six hours of gameplay, and we spent most of that time in the three ultra-difficult levels of the last act. Addictive multiplayer modes are a redeeming factor and round out a very satisfying package.

—NORMAN CHAN

GHOST RECON 2

• \$50, [www.ghostrecon.com](http://www.ghostrecon.com)  
ESRB: T

8

## Shadowrun

No, we've never played the pen-and-paper RPG either



Dwarves drain the "essence" from anything near them, including players and magical items like the Tree of Life.

We were skeptical when Microsoft announced that Shadowrun would be the first game to support full cross-platform multiplayer between PCs and Xbox 360s. Luckily, after several weeks of playing the game, we can report that it is not only fair and balanced for all players but also a truly innovative multiplayer experience that's loads of fun.

With four classes, an arsenal of weapons, and numerous magic and tech abilities to purchase, every player can design a character to match their play style.

Suprisingly, it was tough to distinguish between PC and console players in-game. Though connecting to games with the TruSkill matchmaking system often took several minutes. The biggest kicker is that Shadowrun also requires Windows Vista, even though it doesn't use DirectX 10. So although it's a highly addictive and fun multiplayer game, a few quibbles hinder its true potential.

—NORMAN CHAN

SHADOWRUN

• \$50, [www.shadowrun.com](http://www.shadowrun.com)  
ESRB: M

8

## Test Drive Unlimited

Massive. Multiplayer. A whole lotta fun



Test Drive delivers straight-up racing on the island of Oahu against real players. We like that a lot.

Test Drive Unlimited delivers a massively multiplayer real-world driving experience.

You'll race through a series of single- and multiplayer challenges (on the island of Oahu) to earn cash, which you can use to purchase new cars and houses.

Test Drive's seamless multiplayer world sets the game apart from the competition. You can compete against live opponents in any of the game's challenges and even place side bets with other players on the outcome of the race.

Unfortunately, due to some balancing issues, the initial learning curve is much more difficult than it should be for a massively multiplayer game.

However, if you stick with it, the game is very rewarding. There's an almost limitless number of cars to purchase, ranging from common vehicles like the Audi Quattro to superexotics and classics, think Ferrari and Lamborghini, and there are even motorcycles!

—WILL SMITH

TEST DRIVE UNLIMITED

• \$40, [www.testdriveunlimited.com](http://www.testdriveunlimited.com), ESRB: E 10+

9

## Jade Empire

Yes, you can fight like the Drunken Master



Dodging in Jade Empire turns your character into an Olympic gymnast, sans pommel horse.

Like Midas, anything BioWare touches turns to gold. And Jade Empire, the latest Xbox port to hit the computer scene, is no exception. It's no Knights of the Old Republic, but it certainly reminds us of the epic RPG, with enough feudal-themed creativity added in to make for fresh moments throughout its seven chapters of gameplay.

The story line is reminiscent of a kung fu movie's—assassins attack your martial arts school, your mentor goes missing after revealing a substantial plot device, and you're left to pick up the pieces.

But part of the fun comes from the light side/dark side-style choices you have to make in your quest. Your morality doesn't greatly influence your traveling companions, as it does in KOTOR 2, but it does make for some

great in-game moments.

Mashing the attack button typically results in a surefire victory in the game's earlier chapters, but we were pleased to see a bit of AI development as Jade Empire progressed. Sure, the red shirts still love the taste of your knuckle sandwiches, but if you try to go willy-nilly on a boss without any kind of blocking strategy, you're apt to get served.

It's a shame said traveling companions are utterly worthless when it comes time to throw down. Their poor attack skills almost match their fairly useless "support" function.

—DAVID MURPHY

JADE EMPIRE

• \$40, [www.bioware.com](http://www.bioware.com)  
ESRB: M

8



## Sam & Max

Proof that adventure gaming isn't dead!

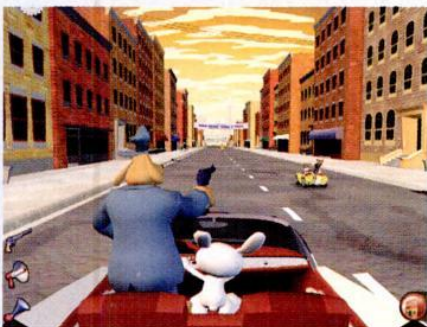
We've waited for over a decade for the return of Sam and Max, the caricatured freelance detectives from the deranged mind of Steve Purcell. After LucasArts's controversial cancellation of the duo's highly anticipated adventure in 2005, Telltale Games came to the rescue to bring these lovable gumshoes back to PC gaming. We're happy to report that fans will not be disappointed.

—NORMAN CHAN

### EPISODE 1: CULTURE SHOCK

The first of six planned episodes for the invigorated franchise quickly reacquaints you with the twisted world of Sam & Max before immediately launching you into a puzzling case involving washed-up child actors and fitness gurus. You control Sam, the laid-back canine with a sharp wit, who is followed by Max, a maniacally insane rabbit who provides most of the game's physical humor. Fans will love the faithfully re-created style and art direction from the last game (but now in stunning 3D) and will appreciate familiar set designs and characters. Yes, the DeSoto is back, too!

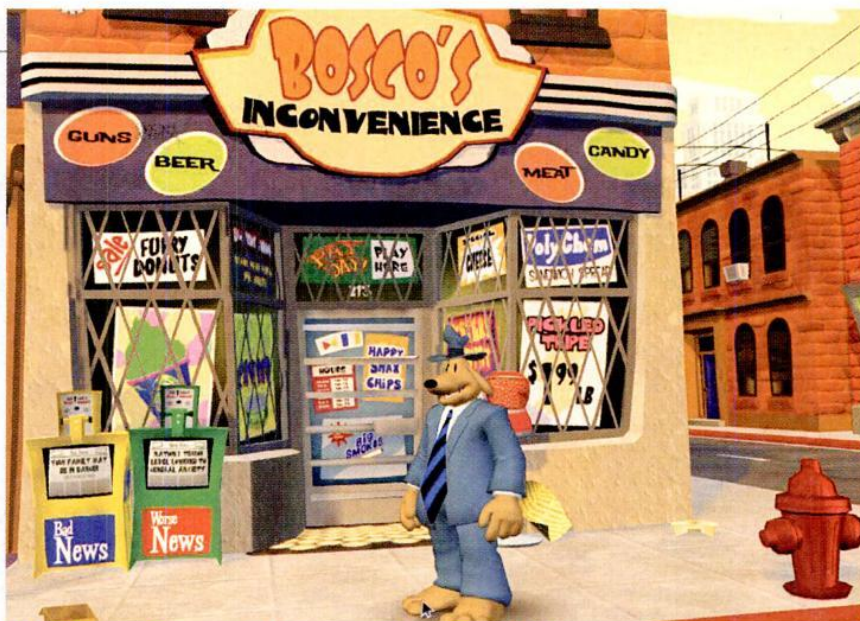
You're charged with investigating the strange behavior of the Soda Poppers, a group of former child stars vandalizing the town and harassing Bosco, the "inconvenience" store owner. The puzzles that must be solved to unravel the mystery range from completing very simple acts (dropping a bowling ball on someone's head) to undertaking obscure challenges involving car chases and tear gas. We were sometimes stumped by the more difficult puzzles near the end of the game, but exploring hilarious dialogue trees for clues and revisiting each location eventually did the trick. The designers



The car-chase minigame has you tailing rats and pulling over innocent drivers.

have ensured that solving a tough puzzle to progress the story is incredibly rewarding, but also that you're consistently entertained by the minor details of the game world, even when you're stuck.

One thing we would've liked is the inclusion



Not only does Bosco run the "inconvenience store," he's a world-class inventor as well.

of more minigames to further extend the life of the game. We completed the story in about five hours, including exhausting all possible conversation paths we could find. But for less than a Hamilton, you're still getting a lot of great game. This first episode is a success not only for the adventure-game genre, but for episodic gaming as well. The crafty writing and well-polished game design prove to be winning ingredients in a long-awaited dish.

#### CULTURE SHOCK

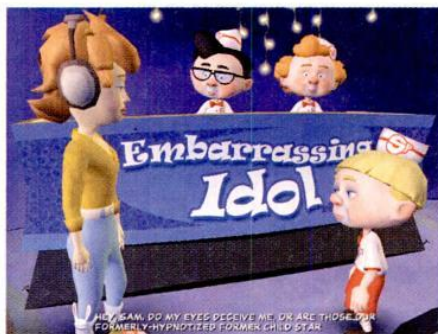
9

• \$9 or \$35 for a season pass,  
[www.telltalegames.com](http://www.telltalegames.com), ESRB: NR

### EPISODE 2: SITUATION: COMEDY

The second episode of Sam & Max not only brings a new case to the private eyes but also hints at the overarching mystery that'll tie the entire season together. Characters from the first episode return to take on new roles, and the puzzles get harder in order to stress your problem-solving skills. The novelty of the dynamic between Sam and Max wears off a little, but we have to give props to the writers for continuing to create laugh-out-loud scripts for the game.

This time, an Oprah-esque talk show host is holding her audience hostage, and it's up to you to find a way into her studio. The mystery is clearly broken down into three challenges that you can complete in any order: filming a television pilot, winning a recording contract, and being featured in a tabloid. The Soda Poppers come back to judge an *American Idol*-inspired singing competition, and Sybil (who was a psychiatrist last time) returns as a gossip journalist. Many of the environments are



We can't help but chuckle at the creative character design.

reused in new capacities (Bosco's store, the office), but plenty of new sets keep the episode from feeling like too much of a rehash.

You might breeze through much of the first episode, but the puzzles here would have even MacGyver scratching his head. In one segment, we baked a cake with lard and squid tentacles but weren't given any indication of how or where to use it. We ended up trying to "apply" it to every object and character in the game before getting it to the right person. One suggestion: Be sure you save before the final scene—branching dialogue options make it easy to get lost if you're not paying close attention.

We walked away from the second installment satisfied but not as enthralled as we were after playing the first. Like any good serial, the whole (so far) is more enjoyable than its individual parts. We can't wait to see how the rest of the arc pans out. **MPC**

#### SITUATION: COMEDY

8

• \$9 or \$35 for a season pass,  
[www.telltalegames.com](http://www.telltalegames.com), ESRB: NR



# Xbox 360 HD DVD Drive

We were shocked when Microsoft began selling its HD DVD add-on for the Xbox 360 for just \$200. We were even more shocked when we learned it works with Windows. Our shock reached new plateaus of ludicrous-

ness when we discovered that HD DVD playback works. And, our shock reached previously unimaginable heights when we cracked the case and saw the hardware's unexpected design.

**CASE** Though it looks like a standard external optical drive cage, Microsoft's HD DVD drive features a fairly unique design: The USB controller is mounted directly on the back of the drive.

**OPTICAL DRIVE** Toshiba's SD-S802A looks like a typical internal 5.25-inch optical drive, but instead of a standard IDE connector, it sports a laptop IDE connector, which delivers both data and power connectivity.

**GREEN PCB ON BACK OF DRIVE** This PCB hosts a 256MB Samsung flash memory chip as well as a USB controller and IDE controller. These chips convert the IDE signal produced by the drive into a USB signal, allowing you to connect the drive to your PC or Xbox using a simple USB cable.

**POWER SUPPLY** Like many other consumer electronics devices, the HD DVD drive sports an open power supply. If you take yours apart, be extremely careful of the large capacitors, as they can hold a charge even after the device is unplugged.

Any requests? What hardware—new or old—would you like to see go under *Maximum PC's* autopsy knife? Email your suggestions to [input@maxmumpc.com](mailto:input@maxmumpc.com).



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